

Test oil  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: NEWHA

BOSCH No. 9 460 610 395  
ZEXEL No. 104740-0114  
Date: 31.01.1992 [0]  
Company: MAZDA  
No. SE0813800B

Injection pump no.: 104640-0344

(NP-VE4/10F1900RNP51)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

1. Setting values		P. Speed (rpm)	Setting values	Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1500	5.0 - 5.4 (mm)		
1-2	Supply pump pressure	1500	5.7 - 6.3 (kg/cm <sup>2</sup> )		
1-3	Full load delivery	1000	53.1 - 54.1 (cc/1000st)		3.5
	Full load delivery		(cc/1000st)		
1-4	Idle speed regulation	350	10.8 - 14.8 (cc/1000st)		2.5
1-5	Start	100	above 78.0 (cc/1000st)		
1-6	Full-load speed regulation	2100	19.1 - 25.1 (cc/1000st)		5.5
1-7	Load-timer adjustment				

## 2. Test values

2-1 Timing device	N = rpm mm		1000 1.6-2.8	1500 4.9-5.5	1900 7.0-8.2
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>	500 2.3-2.9		1500 5.7-6.3	1900 7.1-7.7
2-3 Overflow delivery	N = rpm cc/10s		1000 53 - 97		

## 2-4 Fuel injection quantities

Speed control lever pos.	P. Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)
End stop	1000	52.6 - 54.6		
	500	45.6 - 49.6		
	1500	50.3 - 54.3		
	1900	46.4 - 50.4		
	2100	19.1 - 25.1		
	2200	below 6.0		
Switch off	350	0		
Idle- stop	350	10.8 - 14.8		
	below 620	0		

2-5 Solenoid Cut-in voltage max.: 16V  
Test voltage: 24 - 26V

## 3. Dimensions

K 3.2 - 3.4 mm  
KF 5.7 - 5.9 mm  
MS 1.7 - 1.9 mm  
BCS - mm  
Pre-st. 0.18 - 0.22 mm

## Control lever angle

$\alpha$  18° - 22° deg  
A 35.9 - 38.6 mm  
 $\beta$  33° - 43° deg  
B 10.2 - 13.9 mm  
 $\gamma$  - deg  
C - mm

A1

ZEXEL - Test specifications  
Injection pumps



A2

ZEXEL - Test specifications  
Injection pumps



Test oil		ZEXEL - TEST VALUES				1/2	
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 387	
SAE J967d		Engine model: 4D56				ZEXEL No. 104740-3643	
						Date: 31.01.1992 [0]	
						Company: MITSUBISHI	
						No. MD103207	
Injection pump no.: 104640-3353		(NP-VE4/10F2100RNP430)					
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:				Test pressure line:	
		1 688 901 000				1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1250	3.5 - 3.9 (mm)			540 - 560	4.5
1-2	Supply pump pressure	1250	4.5 - 5.1 (kg/cm²)			540 - 560	
1-3	Full load delivery	1250	61.4 - 62.4 (cc/1000st)			540 - 560	
	Full load delivery	750	60.4 - 61.4 (cc/1000st)			320 - 340	2.0
1-4	Idle speed regulation	375	6.5 - 9.5 (cc/1000st)			0	
1-5	Start	100	63.0 - 83.0 (cc/1000st)			0	
1-6	Full-load speed regulation	2650	22.2 - 28.2 (cc/1000st)			540 - 560	5.5
1-7	Load-timer adjustment	1250	T = 0.4-0.8 (mm)			540 - 460	
2. Test values							
2-1 Timing device	N = rpm mm	500 0.6-1.8	750 1.4-2.6	1250 3.3-4.1	2100 6.6-7.8		
2-2 Supply pump	N = rpm kg/cm²		600 2.9-3.5	1250 4.5-5.1	2100 6.5-7.1		
2-3 Overflow delivery	N = rpm cc/10s			1250 48.0-92.0			
2-4 Fuel injection quantities							
Speed control lever pos.	P. Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)			
End stop	1250	60.9 - 62.9	540 - 560				
	600	45.8 - 50.8	0				
	750	59.9 - 61.9	320 - 340				
	2100	52.8 - 57.8	540 - 560				
	2650	20.2 - 30.2	540 - 560				
	3050	below 5.0	540 - 560				
Switch off	375	0	0				
Idle-stop	600	below 3.0	0				
	375	6.0 - 10.0	0				
2-5 Solenoid	Cut-in voltage max.:8V Test voltage: 12 - 14V						

3. Dimensions	
K	3.2 - 3.4 mm
KF	5.7 - 5.9 mm
MS	0.9 - 1.1 mm
BCS	3.6 - 3.8 mm
Pre-st.	- mm
Control lever angle	
α	55° - 63° deg
A	10.9 - 16.0 mm
β	38° - 48° deg
B	12.1 - 15.6 mm
γ	- deg
C	- mm

**A3**

ZEXEL - Test specifications  
Injection pumps


**A4**

ZEXEL - Test specifications  
Injection pumps



# 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure:	540 - 560	mmHg
Pump Speed :	1250	rpm
Fuel Injection Quantity:	49.8 - 50.8	cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1 - 7).

# 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	49.3 - 51.3	540 - 560	(3.1)	0.2 - 1.0
1250	38.7 - 41.7	540 - 560	(2.3)	0.8 - 2.0

1. After adjusting full Q of 1250 rpm, set the boost pressure, at 750 rpm, at 330 mmHg or 0.45 kg/cm<sup>2</sup>, and adjust Q using the BCS spring's set screw.
2. Adjust the timing device stroke at a boost pressure of 550 mmHg or 0.75 kg/cm<sup>2</sup> by moving the control lever to the full Q position.



Test oil		ZEXEL - TEST VALUES				1/2																											
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 361																											
SAE J967d		Engine model: 4D56				ZEXEL No. 104740-3653																											
						Date: 31.01.1992 [2]																											
						Company: MITSUBISHI																											
						No. MD103208																											
Injection pump no.: 104640-3353		{NP-VE4/10F2100RNP430}																															
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:				Test pressure line:																											
		1 688 901 000				1 680 750 017																											
1. Setting values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)																										
1-1	Timing device travel	1250	3.5 - 3.9 (mm)			540 - 560	4.5																										
1-2	Supply pump pressure	1250	4.5 - 5.1 (kg/cm²)			540 - 560																											
1-3	Full load delivery	1250	61.4 - 62.4 (cc/1000st)			540 - 560																											
	Full load delivery	750	60.4 - 61.4 (cc/1000st)			320 - 340	2.0																										
1-4	Idle speed regulation	375	6.5 - 9.5 (cc/1000st)			0																											
1-5	Start	100	63.0 - 83.0 (cc/1000st)			0																											
1-6	Full-load speed regulation	2650	22.2 - 28.2 (cc/1000st)			540 - 560	5.5																										
1-7	Load-timer adjustment	1250	T-0.4-0.8 (mm)			540 - 560																											
2. Test values																																	
2-1	Timing device	N = rpm mm	500 0.6-1.8	750 1.4-2.6	1250 3.3-4.1	2100 6.6-7.8	<table><tr><td colspan="2">3. Dimensions</td></tr><tr><td>K</td><td>3.2 - 3.4 mm</td></tr><tr><td>KF</td><td>5.7 - 5.9 mm</td></tr><tr><td>MS</td><td>0.9 - 1.1 mm</td></tr><tr><td>BCS</td><td>3.6 - 3.8 mm</td></tr><tr><td>Pre-st.</td><td>- mm</td></tr><tr><td colspan="2">Control lever angle</td></tr><tr><td>α</td><td>55° - 63° deg</td></tr><tr><td>A</td><td>10.9 - 16.0 mm</td></tr><tr><td>β</td><td>38° - 48° deg</td></tr><tr><td>B</td><td>12.1 - 15.6 mm</td></tr><tr><td>γ</td><td>- deg</td></tr><tr><td>C</td><td>- mm</td></tr></table>	3. Dimensions		K	3.2 - 3.4 mm	KF	5.7 - 5.9 mm	MS	0.9 - 1.1 mm	BCS	3.6 - 3.8 mm	Pre-st.	- mm	Control lever angle		α	55° - 63° deg	A	10.9 - 16.0 mm	β	38° - 48° deg	B	12.1 - 15.6 mm	γ	- deg	C	- mm
3. Dimensions																																	
K	3.2 - 3.4 mm																																
KF	5.7 - 5.9 mm																																
MS	0.9 - 1.1 mm																																
BCS	3.6 - 3.8 mm																																
Pre-st.	- mm																																
Control lever angle																																	
α	55° - 63° deg																																
A	10.9 - 16.0 mm																																
β	38° - 48° deg																																
B	12.1 - 15.6 mm																																
γ	- deg																																
C	- mm																																
2-2	Supply pump	N = rpm kg/cm²		600 2.9-3.5	1250 4.5-5.1	2100 6.5-7.1																											
2-3	Overflow delivery	N = rpm cc/10s			1250 48.0-92.0																												
2-4 Fuel injection quantities																																	
Speed control lever pos.		P. Speed (rpm)	Fuel delivery (cc/1000st)		Charge-air pres (mmHg)	Difference in delivery (cc)																											
End stop		1250	60.9 - 62.9		540 - 560																												
		600	45.8 - 50.8		0																												
		750	59.9 - 61.9		320 - 340																												
		2100	52.8 - 57.8		540 - 560																												
		2650	20.2 - 30.2		540 - 560																												
		3050	below 5.0		540 - 560																												
Switch off		375	0		0																												
Idle-stop		600	below 3.0		0																												
		375	6.0 - 10.0		0																												
2-5 Solenoid		Cut-in voltage max.:8V Test voltage: 12 - 14V																															

**A7**

ZEXEL - Test specifications  
Injection pumps


**A8**

ZEXEL - Test specifications  
Injection pumps





# 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure:	540 - 560	mmHg
Pump Speed :	1250	rpm
Fuel Injection Quantity:	49.8 - 50.8	cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1 - 7).

# 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm.)	Timer stroke reduction value (mm)
1250	49.3 - 51.3	540 - 560	(3.1)	0.2 - 1.0
1250	38.7 - 41.7	540 - 560	(2.3)	0.8 - 2.0

1. After adjusting full Q of 1250 rpm, set the boost pressure, at 750 rpm, at 330 mmHg or 0.45 kg/cm<sup>2</sup>, and adjust Q using the BCS spring's set screw.
2. Adjust the timing device stroke at a boost pressure of 550 mmHg or 0.75 kg/cm<sup>2</sup> by moving the control lever to the full Q position.



Test oil		ZEXEL - TEST VALUES				1/3	
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 396	
SAE J967d		Engine model: 4D56				ZEXEL No. 104740-3673	
						Date: 31.01.1992 [0]	
						Company: MITSUBISHI	
						No. MD106444	
Injection pump no.: 104640-3373		(NP-VE4/10F2100RNP460)					
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:				Test pressure line:	
		1 688 901 000				1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1250	3.5 - 3.9 (mm)				3.0
1-2	Supply pump pressure	1250	4.5 - 5.1 (kg/cm²)				
1-3	Full load delivery	1250	45.3 - 46.3 (cc/1000st)				
	Full load delivery		(cc/1000st)				
1-4	Idle speed regulation	375	6.5 - 9.5 (cc/1000st)				2.0
1-5	Start	100	63.0 - 83.0 (cc/1000st)				
1-6	Full-load speed regulation	2550	15.1 - 21.1 (cc/1000st)				
1-7	Load-timer adjustment	1250	T-0.4-0.8 (mm)				4.0
2. Test values							
2-1	Timing device	N = rpm mm	500 0.6-1.8	750 1.4-2.6	1250 3.3-4.1	2100 6.6-7.8	
2-2	Supply pump	N = rpm kg/cm²		600 2.9-3.5	1250 4.5-5.1	2100 6.5-7.1	
2-3	Overflow delivery	N = rpm cc/10s	1250 48.0-92.0				
2-4 Fuel injection quantities							
Speed control lever pos.		P. Speed (rpm)	Fuel delivery (cc/1000st)		Charge-air pres (mmHg)	Difference in delivery (cc)	
End stop		1250	44.8 - 46.8				
		600	42.3 - 45.3				
		2100	37.2 - 41.2				
		2550	13.1 - 23.1				
		2900	below 5.0				
Switch off		375	0				
Idle-stop		600	below 3.0				
		375	6.0 - 10.0				
2-5 Solenoid		Cut-in voltage max.:8V Test voltage: 12 - 14V					

3. Dimensions	
K	3.2 - 3.4 mm
KF	5.7 - 5.9 mm
MS	1.1 - 1.3 mm
BCS	- mm
Pre-st.	- mm
Control lever angle	
α	55° - 63° deg
A	10.5 - 16.0 mm
β	41° - 51° deg
B	12.5 - 16.5 mm
γ	- deg
C	- mm

**A11**

ZEXEL - Test specifications

Injection pumps


**A12**

ZEXEL - Test specifications

Injection pumps



# 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

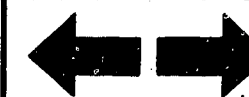
Boost Pressure: - mmHg  
 Pump Speed : 1250 rpm  
 Fuel Injection Quantity: 35.7 ± 0.5 cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1-7).

# 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	34.7 - 36.7	-	(3.1)	0.2 - 1.0
1250	26.7 - 29.7	-	(2.3)	0.8 - 2.0



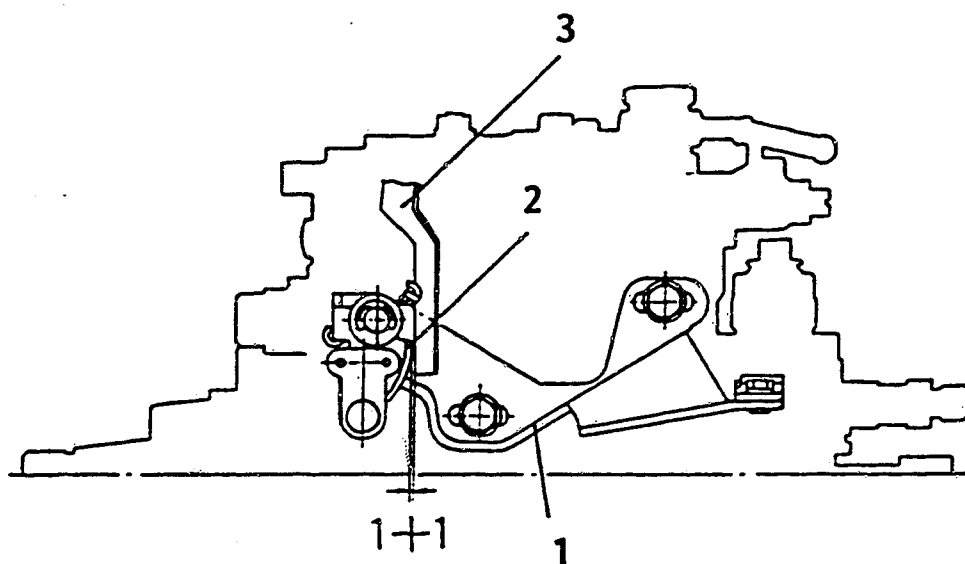


Figure 1

104740-3673 3/3

- 1 = Bracket
- 2 = M-FICD lever
- 3 = Control lever

#### ■ FICD MOUNTING POSITION ADJUSTMENT

1. Hold the control lever in the idling position.
2. Position the FICD mounting bracket so that the gap between the control lever and the FICD lever is 1 + 1 mm.



Test oil  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: '4D56

1/2

BOSCH No.	9 460 610 397
ZEXEL No.	104740-3683
Date:	31.01.1992 [2]
Company:	MITSUBISHI
No.	MD106426

Injection pump no.: 104640-3383

(NP-VE4/10F2100RNP461)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

1. Setting values		P. Speed (rpm)	Setting values	Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1250	3.5 - 3.9 (mm)		
1-2	Supply pump pressure	1250	4.5 - 5.1 (kg/cm <sup>2</sup> )		
1-3	Full load delivery	1250	45.3 - 46.3 (cc/1000st)		3.0
	Full load delivery		(cc/1000st)		
1-4	Idle speed regulation	375	6.5 - 9.5 (cc/1000st)		2.0
1-5	Start	100	63.0 - 83.0 (cc/1000st)		
1-6	Full-load speed regulation	2550	15.1 - 21.1 (cc/1000st)		4.0
1-7	Load-timer adjustment	1250	T-0.4-0.8 (mm)		

## 2. Test values

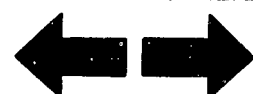
2-1 Timing device	N = rpm mm	500 0.6-1.8	750 1.4-2.6	1250 3.3-4.1	2100 6.6-7.8		<table><tr><th colspan="2">3. Dimensions</th></tr><tr><td>K</td><td>3.2 - 3.4 mm</td></tr><tr><td>KF</td><td>5.7 - 5.9 mm</td></tr></table>	3. Dimensions		K	3.2 - 3.4 mm	KF	5.7 - 5.9 mm
3. Dimensions													
K	3.2 - 3.4 mm												
KF	5.7 - 5.9 mm												
2-2 Supply pump	N = rpm kg/cm²		600 2.9-3.5	1250 4.5-5.1	2100 6.5-7.1								
2-3 Overflow delivery	N = rpm cc/10s			1250 48.0-92.0									

## 2-4 Fuel injection quantities

Speed control lever pos.	P. Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)
End stop	1250	44.8 - 46.8		
	600	42.3 - 46.3		
	2100	37.2 - 41.2		
	2550	14.6 - 21.6		
	2900	below 5.0		
Switch off	375	0		
Idle- stop	600	below 3.0		
	375	6.0 - 10.0		
2-5 Solenoid	Cut-in voltage max.:8V Test voltage: 12 - 14V			

### 3. Dimensions

K	3.2 - 3.4 mm
KF	5.7 - 5.9 mm
MS	1.1 - 1.3 mm
BCS	- mm
Pre-st.	- mm
Control lever angle	
$\alpha$	19° - 27° deg
A	10.9 - 16.0 mm
$\beta$	36° - 46° deg
B	11.4 - 15.0 mm
$\gamma$	- deg
C	- mm



## 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

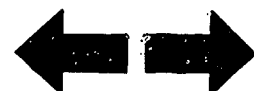
Boost Pressure: - mmHg  
 Pump Speed : 1250 rpm  
 Fuel Injection Quantity: 34.7 - 36.7 cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1-7).

## 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	34.7 - 36.7	-	3.1	0.2 - 1.0
1250	26.7 - 29.7	-	2.3	0.8 - 2.0



Test oil		ZEXEL - TEST VALUES				1/2	
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 398	
SAE J967d		Engine model: 4D56				ZEXEL No. 104740-3693	
						Date: 31.01.1992 [2]	
						Company: MITSUBISHI	
						No. MD109319	
Injection pump no.: 104640-3383		(NP-VE4/10F2100RNP461)					
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:				Test pressure line:	
		1 688 901 000				1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1250	3.5 - 3.9 (mm)				3.0
1-2	Supply pump pressure	1250	4.5 - 5.1 (kg/cm²)				
1-3	Full load delivery	1250	45.3 - 46.3 (cc/1000st)				
	Full load delivery		(cc/1000st)				
1-4	Idle speed regulation	375	6.5 - 9.5 (cc/1000st)				2.0
1-5	Start	100	63.0 - 83.0 (cc/1000st)				
1-6	Full-load speed regulation	2550	15.1 - 21.1 (cc/1000st)				4.0
1-7	Load-timer adjustment	1250	T-0.4-0.8 (mm)				
2. Test values							
2-1	Timing device	N = rpm mm	500 0.6-1.8	750 1.4-2.6	1250 3.3-4.1	2100 6.6-7.8	
2-2	Supply pump	N = rpm kg/cm²		600 2.9-3.5	1250 4.5-5.1	2100 6.5-7.1	
2-3	Overflow delivery	N = rpm cc/10s			1250 48.0-92.0		
2-4 Fuel injection quantities							
Speed control lever pos.		P. Speed (rpm)	Fuel delivery (cc/1000st)		Charge-air pres (mmHg)	Difference in delivery (cc)	
End stop		1250	44.8 - 46.8				
		600	42.3 - 46.3				
		2100	37.2 - 41.2				
		2550	14.6 - 21.6				
		2900	below 5.0				
Switch off		375	0				
Idle-stop		600	below 3.0				
		375	6.0 - 10.0				
2-5 Solenoid		Cut-in voltage max.:8V Test voltage: 12 - 14V					

3. Dimensions		
K	3.2 - 3.4 mm	
KF	5.7 - 5.9 mm	
MS	1.1 - 1.3 mm	
BCS	- mm	
Pre-st.	- mm	
Control lever angle		
α	19° - 27° deg	
A	10.9 - 16.0 mm	
β	36° - 46° deg	
B	11.4 - 15.0 mm	
γ	- deg	
C	- mm	

**A 20**

ZEXEL - Test specifications  
Injection pumps


**A 21**

ZEXEL - Test specifications  
Injection pumps



# 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure: - mmHg  
 Pump Speed : 1250 rpm  
 Fuel Injection Quantity: 34.7 - 36.7 cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1-7).

# 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	34.7 - 36.7	-	3.1	0.2 - 1.0
1250	26.7 - 29.7	-	2.3	0.8 - 2.0





Test oil		ZEXEL - TEST VALUES				1/2																									
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 522																									
SAE J967d		Engine model: 4D56				ZEXEL No. 104740-3713																									
						Date: 31.01.1992 [0]																									
						Company: MITSUBISHI																									
						No. MD106428																									
Injection pump no.: 104640-3393		(NP-VE4/10F2100RNP462)																													
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:				Test pressure line:																									
		1 688 901 000				1 680 750 017																									
1. Setting values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)																								
1-1	Timing device travel	1250	3.5 - 3.9 (mm)			540 - 560	4.5																								
1-2	Supply pump pressure	1250	4.5 - 5.1 (kg/cm²)			540 - 560																									
1-3	Full load delivery	1250	61.4 - 62.4 (cc/1000st)			540 - 560																									
	Full load delivery	750	60.4 - 61.4 (cc/1000st)			320 - 340	2.0																								
1-4	Idle speed regulation	375	6.5 - 9.5 (cc/1000st)			0																									
1-5	Start	100	63.0 - 83.0 (cc/1000st)			0	5.5																								
1-6	Full-load speed regulation	2650	22.2 - 28.2 (cc/1000st)			540 - 560																									
1-7	Load-timer adjustment	1250	T-0.4-0.8 (mm)			540 - 560																									
2. Test values																															
2-1	Timing device	N = rpm mm	500 0.6-1.8	750 1.4-2.6	1250 3.3-4.1	2100 6.6-7.8	<div>3. Dimensions</div> <table><tr><td>K</td><td>3.2 - 3.4 mm</td></tr><tr><td>KF</td><td>5.7 - 5.9 mm</td></tr><tr><td>MS</td><td>0.9 - 1.1 mm</td></tr><tr><td>BCS</td><td>3.6 - 3.8 mm</td></tr><tr><td>Pre-st.</td><td>- mm</td></tr><tr><td colspan="2">Control lever angle</td></tr><tr><td>α</td><td>19° - 27° deg</td></tr><tr><td>A</td><td>10.9 - 16.0 mm</td></tr><tr><td>β</td><td>38° - 48° deg</td></tr><tr><td>B</td><td>12.1 - 15.6 mm</td></tr><tr><td>γ</td><td>- deg</td></tr><tr><td>C</td><td>- mm</td></tr></table>	K	3.2 - 3.4 mm	KF	5.7 - 5.9 mm	MS	0.9 - 1.1 mm	BCS	3.6 - 3.8 mm	Pre-st.	- mm	Control lever angle		α	19° - 27° deg	A	10.9 - 16.0 mm	β	38° - 48° deg	B	12.1 - 15.6 mm	γ	- deg	C	- mm
K	3.2 - 3.4 mm																														
KF	5.7 - 5.9 mm																														
MS	0.9 - 1.1 mm																														
BCS	3.6 - 3.8 mm																														
Pre-st.	- mm																														
Control lever angle																															
α	19° - 27° deg																														
A	10.9 - 16.0 mm																														
β	38° - 48° deg																														
B	12.1 - 15.6 mm																														
γ	- deg																														
C	- mm																														
2-2	Supply pump	N = rpm kg/cm²		600 2.9-3.5	1250 4.5-5.1	2100 6.5-7.1																									
2-3	Overflow delivery	N = rpm cc/10s			1250 48.0-92.0																										
2-4 Fuel injection quantities																															
Speed control lever pos.	P. Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)																											
End stop	1250	60.9 - 62.9	540 - 560																												
	600	45.8 - 50.8	0																												
	750	59.9 - 61.9	320 - 340																												
	2100	52.8 - 57.8	540 - 560																												
	2650	20.2 - 30.2	540 - 560																												
	3050	below 5.0	540 - 560																												
Switch off	375	0	0																												
Idle-stop	600	below 3.0	0																												
	375	6.0 - 10.0	0																												
2-5 Solenoid	Cut-in voltage max.:8V Test voltage: 12 - 14V																														



1. Adjustment

- 1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure: 540 - 560 mmHg  
 Pump Speed : 1250 rpm  
 Fuel Injection Quantity: 49.8 - 50.8 cc/1000st

- 2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1 - 7).

2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	49.3 - 51.3	540 - 560	(3.1)	0.2 - 1.0
1250	38.7 - 41.7	540 - 560	(2.3)	0.8 - 2.0

- After adjusting full Q of 1250 rpm, set the boost pressure, at 750 rpm, at 330 mmHg or 0.45 kg/cm<sup>2</sup>, and adjust Q using the BCS spring's set screw.
- Adjust the timing device stroke at a boost pressure of 550 mmHg or 0.75 kg/cm<sup>2</sup> by moving the control lever to the full Q position.



Test oil  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: 4D56

1/3  
BOSCH No. 9 460 610 384  
ZEXEL No. 104740-3743  
Date: 31.01.1992 [0]  
Company: MITSUBISHI  
No. MD112513

Injection pump no.: 104640-3333

(NP-VE4/10F2100RNP433)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

1. Setting values	P. Speed (rpm)	Setting values	Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1 Timing device travel	1250	3.5 - 3.9 (mm)		
1-2 Supply pump pressure	1250	4.5 - 5.1 (kg/cm <sup>2</sup> )		
1-3 Full load delivery	1250	45.3 - 46.3 (cc/1000st)		3.0
Full load delivery		(cc/1000st)		
1-4 Idle speed regulation	375	6.5 - 9.5 (cc/1000st)		2.0
1-5 Start	100	63.0 - 83.0 (cc/1000st)		
1-6 Full-load speed regulation	2550	15.1 - 21.1 (cc/1000st)		4.0
1-7 Load-timer adjustment	1250	T-0.4-0.8 (mm)		

## 2. Test values

2-1 Timing device	N = rpm mm	500 0.6-1.8	750 1.4-2.6	1250 3.3-4.1	2100 6.6-7.8	
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>		600 2.9-3.5	1250 4.5-5.1	2100 6.5-7.1	
2-3 Overflow delivery	N = rpm cc/10s	1250 48.0-92.0				

## 2-4 Fuel injection quantities

Speed control lever pos.	P. Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)
End stop	1250 600 2100 2550 2900	44.8 - 46.8 42.3 - 46.3 37.2 - 41.2 13.1 - 23.1 below 5.0		
Switch off	375	0		
Idle-stop	600 375	below 3.0 6.0 - 10.0		

2-5 Solenoid  
Cut-in voltage max.: 8V  
Test voltage: 12 - 14V

## 3. Dimensions

K	3.2 - 3.4 mm
KF	5.7 - 5.9 mm
MS	1.1 - 1.3 mm
BCS	- mm
Pre-st.	- mm
Control lever angle	
α	55° - 63° deg
A	10.5 - 16.0 mm
β	41° - 51° deg
B	12.5 - 16.5 mm
γ	- deg
C	- mm

B1

ZEXEL - Test specifications  
Injection pumps



B2

ZEXEL - Test specifications  
Injection pumps



## 1. Adjustment

- 1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure: - mmHg  
Pump Speed : 1250 rpm  
Fuel Injection Quantity:  $35.7 \pm 0.5$  cc/1000st

- 2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values.

## 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	34.7 - 36.7	-	(3.1)	0.2 - 1.0
1250	26.7 - 29.7	-	(2.3)	0.8 - 2.0



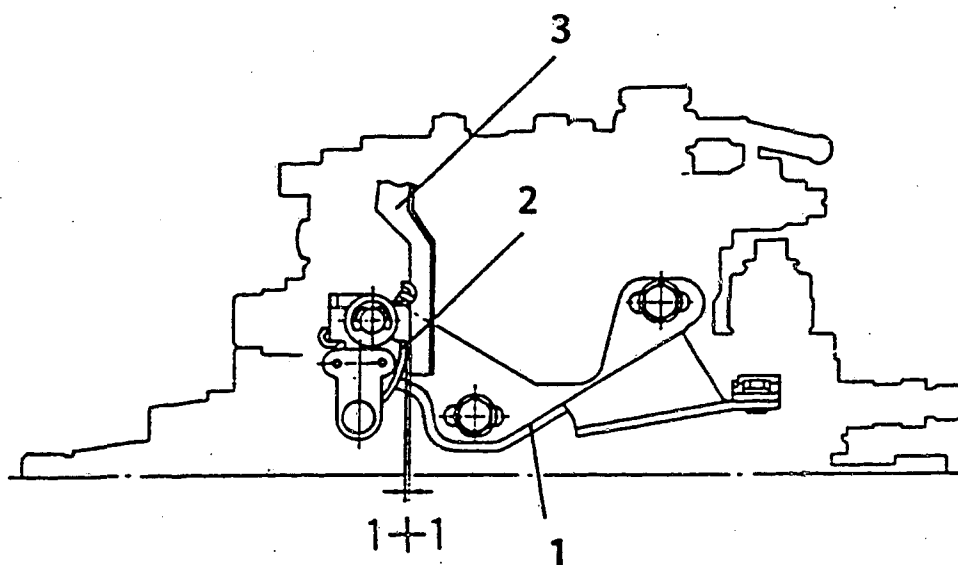


Figure 2

104740-3743 3/3

- 1 = Bracket
- 2 = M-FICD lever
- 3 = Control lever

#### ■ FICD MOUNTING POSITION ADJUSTMENT

1. Hold the control lever in the idling position.
2. Position the FICD mounting bracket so that the gap between the control lever and the FICD lever is 1 + 1 mm.



Test oil		ZEXEL - TEST VALUES					1/2	
ISO 4113 or		Distributor pumps					BOSCH No. 9 460 610 433	
SAE J967d		Engine model: 4D56					ZEXEL No. 104740-3910	
							Date: 31.01.1992 [0]	
							Company: MITSUBISHI	
							No. MD155266	
Injection pump no.: 104640-3910		(NP-VE4/10F2100RNP823)						
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:					Test pressure line:	
		1 688 901 000					1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)	
1-1	Timing device travel	1250	4.3 - 4.7 (mm)				3.0	
1-2	Supply pump pressure	1250	4.5 - 5.1 (kg/cm²)					
1-3	Full load delivery	1250	45.3 - 46.3 (cc/1000st)					
	Full load delivery		(cc/1000st)					
1-4	Idle speed regulation	375	8.5 - 11.5 (cc/1000st)				2.0	
1-5	Start	100	63.0 - 83.0 (cc/1000st)					
1-6	Full-load speed regulation	2550	15.1 - 21.1 (cc/1000st)				4.0	
1-7	Load-timer adjustment	1250	T-0.4-0.8 (mm)					
2. Test values								
2-1	Timing device	N = rpm	500	750	1250	1750	2100	
		mm	1.6-2.4	2.4-3.2	4.2-4.8	6.0-7.2	7.4-8.2	
2-2	Supply pump	N = rpm		1250		2100		
		kg/cm²		4.5-5.1		6.5-7.1		
2-3	Overflow delivery	N = rpm		1250				
		cc/10s		48 - 92				
2-4 Fuel injection quantities								
Speed control lever pos.		P. Speed (rpm)	Fuel delivery (cc/1000st)		Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop		1250	44.8 - 46.8					
		600	42.3 - 46.3					
		1750	38.2 - 42.2					
		2100	37.1 - 41.3					
		2550	14.6 - 21.6					
		2900	below 5.0					
Switch off		375	0					
Idle-stop		375	8.5 - 11.5					
		600	below 5.0					
		750	below 3.0					
2-5 Solenoid		Cut-in voltage max.:8V Test voltage: 12 - 14V						

3. Dimensions		
K	3.2 - 3.4 mm	
KF	5.7 - 5.9 mm	
MS	1.1 - 1.3 mm	
BCS	- mm	
Pre-st.	- mm	
Control lever angle		
α	19°- 27° deg	
A	10.9 - 16.0 mm	
β	36°- 46° deg	
B	11.4 - 15.0 mm	
γ	- deg	
C	- mm	

B6

ZEXEL - Test specifications  
Injection pumps



B7

ZEXEL - Test specifications  
Injection pumps



# 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure: - mmHg  
 Pump Speed : 1250 rpm  
 Fuel Injection Quantity: 35.0 - 36.0 cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1-7).

# 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	34.5 - 36.5	-	-	0.3 - 0.9
1250	26.5 - 29.5	-	-	0.9 - 1.9

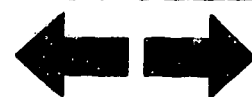


Test oil		ZEXEL - TEST VALUES					1/2	
ISO 4113 or		Distributor pumps					BOSCH No. 9 460 610 434	
SAE J967d		Engine model: 4D56					ZEXEL No. 104740-3920	
							Date: 31.01.1992 [0]	
							Company: MITSUBISHI	
							No. MD155265	
Injection pump no.: 104640-3910		(NP-VE4/10F2100RNP823)						
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:					Test pressure line:	
		1 688 901 000					1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)	
1-1	Timing device travel	1250	4.3 - 4.7 (mm)				3.0	
1-2	Supply pump pressure	1250	4.5 - 5.1 (kg/cm²)					
1-3	Full load delivery	1250	45.3 - 46.3 (cc/1000st)					
	Full load delivery		(cc/1000st)					
1-4	Idle speed regulation	375	8.5 - 11.5 (cc/1000st)				2.0	
1-5	Start	100	63.0 - 83.0 (cc/1000st)					
1-6	Full-load speed regulation	2550	15.1 - 21.1 (cc/1000st)				4.0	
1-7	Load-timer adjustment	1250	T-0.4-0.8 (mm)					
2. Test values								
2-1	Timing device	N = rpm	500	750	1250	1750	2100	
		mm	1.6-2.4	2.4-3.2	4.2-4.8	6.0-7.2	7.4-8.2	
2-2	Supply pump	N = rpm		1250		2100		
		kg/cm²		4.5-5.1		6.5-7.1		
2-3	Overflow delivery	N = rpm.		1250				
		cc/10s		48 - 92				
2-4 Fuel injection quantities								
Speed control lever pos.		P. Speed (rpm)	Fuel delivery (cc/1000st)		Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop		1250	44.8 - 46.8					
		600	42.3 - 46.3					
		1750	38.2 - 42.2					
		2100	37.1 - 41.3					
		2550	14.6 - 21.6					
		2900	below 5.0					
Switch off		375						
Idle-stop		375	8.5 - 11.5					
		600	below 5,0					
		750	below 3.0					
2-5 Solenoid		Cut-in voltage max.:8V Test voltage: 12 - 14V						

3. Dimensions		
K	3.2 - 3.4 mm	
KF	5.7 - 5.9 mm	
MS	1.1 - 1.3 mm	
BCS	- mm	
Pre-st.	- mm	
Control lever angle		
α	19°- 27° deg	
A	10.9 - 16.0 mm	
β	36°- 46° deg	
B	11.4 - 15.0 mm	
γ	- deg	
C	- mm	

**B10**

ZEXEL - Test specifications  
Injection pumps



**B11**

ZEXEL - Test specifications  
Injection pumps





# 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure: - mmHg  
Pump Speed : 1250 rpm  
Fuel Injection Quantity: 35.0 - 36.0 cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1-7).

# 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1250	34.5 - 36.5	-	-	0.3 - 0.9
1250	26.5 - 29.5	-	-	0.9 - 1.9



Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: SD23

BOSCH No.	9 460 610 279
ZEXEL No.	104740-4301
Date:	31.01.1992 [0]
Company:	NISSAN DIESEL
No.	16700 R8310

Injection pump no. 104640-4261

(NP-VE4/10F2000RNP147)

Pump rot.: clockwise-viewed from drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

1. Setting values		P. Speed (rpm)	Setting values	Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1700	4.4 - 4.8 (mm)		3.0
1-2	Supply pump pressure	1700	5.7 - 6.3 (kg/cm <sup>2</sup> )		
1-3	Full load delivery	1000	35.6 - 36.6 (cc/1000st)		
	Full load delivery		(cc/1000st)		
1-4	Idle speed regulation	300	4.3 - 8.3 (cc/1000st)		2.0
1-5	Start	100	55.0 - 90.0 (cc/1000st)		
1-6	Full-load speed regulation	2300	10.6 - 14.6 (cc/1000st)		
1-7	Load-timer adjustment				
1-8					

## 2. Test values

2-1 Timing device	N = rpm mm	1000 1.5 - 2.7	1700 4.3 - 4.9	2000 5.2 - 6.2
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>	600 3.2 - 3.8	1700 5.7 - 6.3	2000 6.5 - 7.1
2-3 Overflow delivery	N = rpm cc/10s	1000 8.0 - 52.0		

## 2-4 Fuel injection quantities

Control lever position	P. Speed (rpm)	Fuel delivery (cc/1000 strokes)	Charge-air pres (mmHg)	Difference in delivery (cc)
End stop	1000	35.1 - 37.1		
	600	29.3 - 33.3		
	2000	30.5 - 34.7		
	2300	10.1 - 15.1		
	2450	below 5.0		
Switch off	300	0		
Idle stop	300	4.3 - 8.3		
	350	below 3.0		

2-5 Solenoid	Cut-in voltage max. 8 V Test voltage: 12 - 14 V
-----------------	--

## 3. Dimensions

K	3.2 - 3.4 mm
KF	5.7 - 5.9 mm
MS	1.4 - 1.6 mm
BCS	- mm
Pre-st.	- mm

## Control lever angle

α	21° - 29° deg
A	4.0 - 9.2 mm
β	37° - 47° deg
B	10.7 - 14.8 mm
γ	- deg
C	- mm

**B14**

ZEXEL - Test specifications  
Injection pumps



**B15**

ZEXEL - Test specifications  
Injection pumps



Test oil:		ZEXEL - TEST VALUES			1/2	
ISO 4113 or		Distributor pumps			BOSCH No. 9 460 610 280	
SAE J967d		Engine model: SD23			ZEXEL No. 104740-4641	
					Date: 31.01.1992 [1]	
					Company: NISSAN DIESEL	
					No. 16700 R8801	
Injection pump no.: 104640-4631		(NP-VE4/10F2150RNP329)				
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:			Test pressure line:	
		1 688 901 000			1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values		Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Time device travel	1000	1.5 - 1.9 (mm)		-164 ± 5	3.0 2.0
1-2	Supply pump pressure	1000	3.9 - 4.5 (kg/cm²)			
1-3	Full load delivery	1000	35.6 - 36.6 (cc/1000st)			
1-4	Idle speed regulation	300	4.3 - 8.3 (cc/1000st)			
1-5	Start	100	45.0 - 80.0 (cc/1000st)			
1-6	Full-load speed regulation	2450	8.2 - 15.6 (cc/1000st)			
1-7	ACS adjustment	1000	Decrease 5.0-6.0 (cc/1000st)			
2. Test values						
2-1 Timing device		N = rpm mm	1000 1.4-2.0	1400 2.6-3.8	2150 5.6-6.8	3. Dimensions
2-2 Supply pump		N = rpm kg/cm²	1000 3.9-4.5	1400 4.9-5.5	2150 6.8-7.4	
2-3 Overflow delivery		N = rpm cc/10s	1000 41.0-85.0			
2-4 Fuel delivery quantities						
Speed control lever pos.		P. Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)	
End stop		1000	35.1 - 37.1	-164 ± 5		
		1000	Decrease 4.5-6.5			
		600	30.3 - 34.3			
		2150	31.9 - 35.9			
		2450	8.1 - 16.1			
		2600	below 5.0			
Switch off		300	0			
Idle-stop		300 350	4.3 - 8.3 below 3.0			
2-5 Solenoid		Cut-in voltage max.: 8V Test voltage: 12 - 14V				

B16

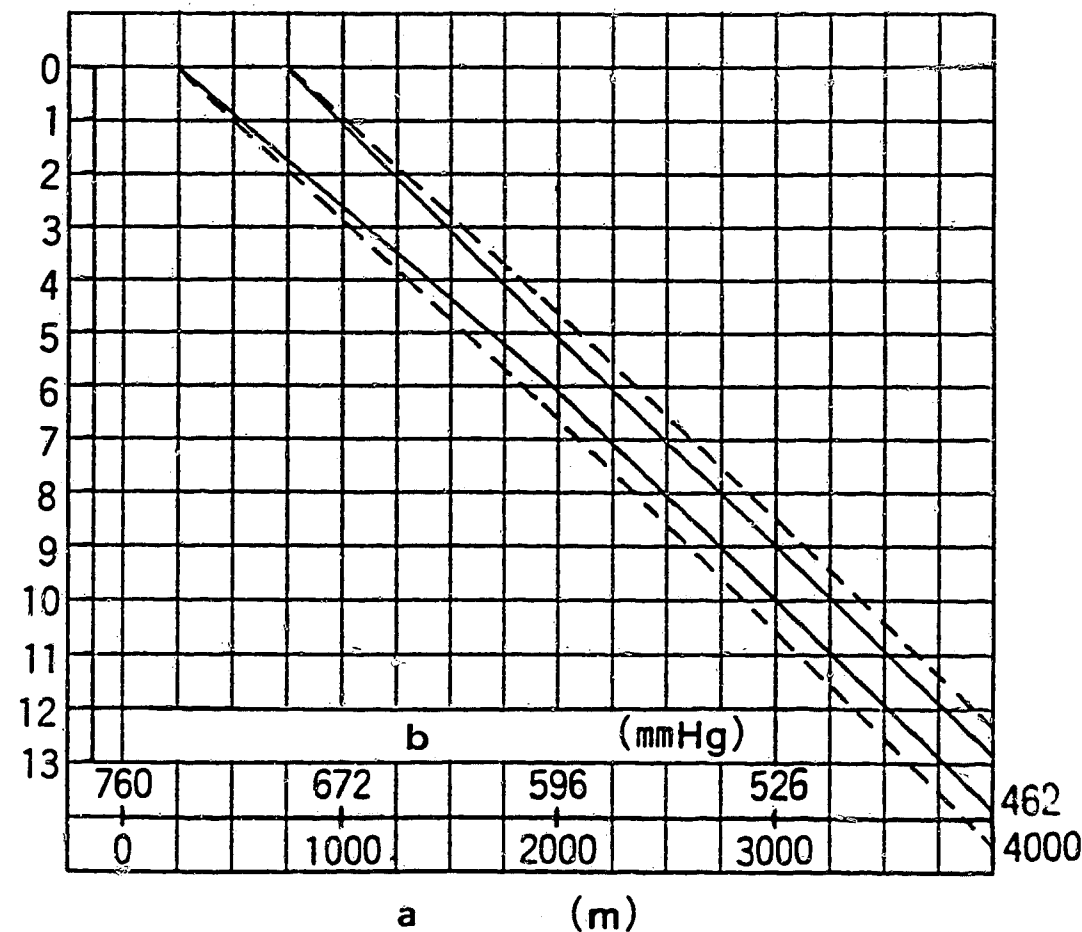
ZEXEL - Test specifications  
Injection pumps



B17

ZEXEL - Test specifications  
Injection pumps





————— A  
 - - - - - B

Figure 3

a = Altitude  
 b = Atmospheric pressure  
 c = Injection quantity decrease (cc/1000st)

A = Adjustment limit  
 B = Inspection limit

104740-4641 2/2

# ■ FULL-LOAD FUEL INJECTION QUANTITY AND ACS ADJUSTING PROCEDURE AT HIGH ALTITUDES

## 1. FULL-LOAD FUEL INJECTION QUANTITY ADJUSTMENT

- 1) Remove the ACS cover, the bellows and the adjusting shims.
- 2) Perform all adjustments as described in the adjusting specifications, except for ACS adjustment.

## 2. ACS ADJUSTMENT

- 1) Attach the ACS cover, the bellows and the adjusting shims.
- 2) At a pump speed of 1000 rpm and referring to the graph above, use the shims to adjust the fuel injection quantity decrease according to the altitude.

B18

ZEXEL - Test specifications  
Injection pumps



B19

ZEXEL - Test specifications  
Injection pumps



Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: SD23

BOSCH No. 9 460 610 281  
ZEXEL No. 104740-4650  
Date: 31.01.1992 [0]  
Company: NISSAN DIESEL  
No. 16700 R8802

Injection pump no.: 104640-4620

(NP-VE4/10F2150RNP328)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

1. Setting values	P. Speed (rpm)	Setting values	Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1 Timing device travel	1000	1.5 - 1.9 (mm)		
1-2 Supply pump pressure	1000	4.0 - 4.6 (kg/cm <sup>2</sup> )		
1-3 Full load delivery	1000	35.6 - 36.6 (cc/1000st)		3.0
Full load delivery		(cc/1000st)		
1-4 Idle speed regulation	300	4.3 - 8.3 (cc/1000st)		2.0
1-5 Start	100	45.0 - 80.0 (cc/1000st)		
1-6 Full-load speed regulation	2450	8.6 - 15.6 (cc/1000st)		
1-7 Load-timer adjustment				
1-8				

## 2. Test values

2-1 Timing device	N = rpm mm	1000 1.4 - 2.0	1400 2.6 - 3.8	2150 5.6 - 6.8
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>	1000 4.0 - 4.6	1400 5.0 - 5.6	2150 6.8 - 7.4
2-3 Overflow delivery	N = rpm cc/10s	1000 8.0 - 52.0		

## 2-4 Fuel injection quantities

Control lever position	P. Speed (rpm)	Fuel delivery (cc/1000 strokes)	Charge-air pres (mmHg)	Difference in delivery (cc)
End stop	1000	35.1 - 37.1		
	600	30.3 - 34.3		
	2150	31.9 - 35.9		
	2450	8.1 - 16.1		
	2600	below 5.0		
Switch off	300	0		
Idle	300	4.3 - 8.3		
stop	350	below 3.0		

2-5 Solenoid  
Cut-in voltage max. 8V  
Test voltage: 12 - 14V

## 3. Dimensions

K 3.2 - 3.4 mm  
KF 5.65 - 5.85 mm  
MS 1.1 - 1.3 mm  
BCS - mm  
Pre-st. 0.18 - 0.22 mm

## Control lever angle

α 21° - 29° deg  
A 4.0 - 9.2 mm  
β 41° - 51° deg  
B 12.1 - 16.1 mm  
γ - deg  
C - mm

B 20

ZEXEL - Test specifications  
Injection pumps



B 21

ZEXEL - Test specifications  
Injection pumps



Test oil:  
ISO 4113 or  
SAE J957d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: SD23

1/2  
BOSCH No. 9 460 610 282  
ZEXEL No. 104740-4660  
Date: 31.01.1992 [1]  
Company: NISSAN DIESEL  
No. 16700 R8803

Injection pump no.: 104640-4640 (NP-VE4/10F2150RNP330)

Pump rot.: Clockwise-viewed from drive side  
Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

1. Setting values		P. Speed (rpm)	Setting values	Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Time device travel	1000	1.5 - 1.9 (mm)		3.0
1-2	Supply pump pressure	1000	4.0 - 4.6 (kg/cm <sup>2</sup> )		
1-3	Full load delivery Full load delivery	1000	35.6 - 36.6 (cc/1000st) (cc/1000st)		
1-4	Idle speed regulation	300	4.3 - 8.3 (cc/1000st)		2.0
1-5	Start	100	45.0 - 80.0 (cc/1000st)		
1-6	Full-load speed regulation	2450	8.6 - 15.6 (cc/1000st)		
1-7	ACS adjustment	1000	Decrease 5.0-6.0 (cc/1000st)	-164 ± 5	

## 2. Test values

2-1 Timing device	N = rpm mm	1000 1.4 - 2.0	1400 2.6 - 3.8	2150 5.6 - 6.8
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>	1000 4.0 - 4.6	1400 5.0 - 5.6	2150 6.8 - 7.4
2-3 Overflow delivery	N = rpm cc/10s	1000 8.0 - 52.0		
2-4 Fuel delivery quantities				
Speed control lever pos.	P. Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)
End stop	1000	35.1 - 37.1	-164 ± 5	
	600	30.3 - 34.3		
	1000	Decrease 4.5-6.5		
	2150	31.9 - 35.9		
	2450	8.1 - 16.1		
	2600	below 5.0		
Switch off	300	0		
Idle- stop	300	4.3 - 8.3		
	350	below 3.0		
2-5 Solenoid	Cut-in voltage max.: 8V Test voltage: 12 - 14V			

## 3. Dimensions

K	3.2 - 3.4 mm
KF	5.65 - 5.85 mm
MS	1.1 - 1.3 mm
BCS	- mm
Prestr.	0.18 - 0.22 mm
Control lever angle	
α	21° - 29° deg
A	4.0 - 9.2 mm
β	41° - 51° deg
B	12.1 - 16.1 mm
γ	- deg
C	- mm

B22

ZEXEL - Test specifications  
Injection pumps



B23

ZEXEL - Test specifications  
Injection pumps



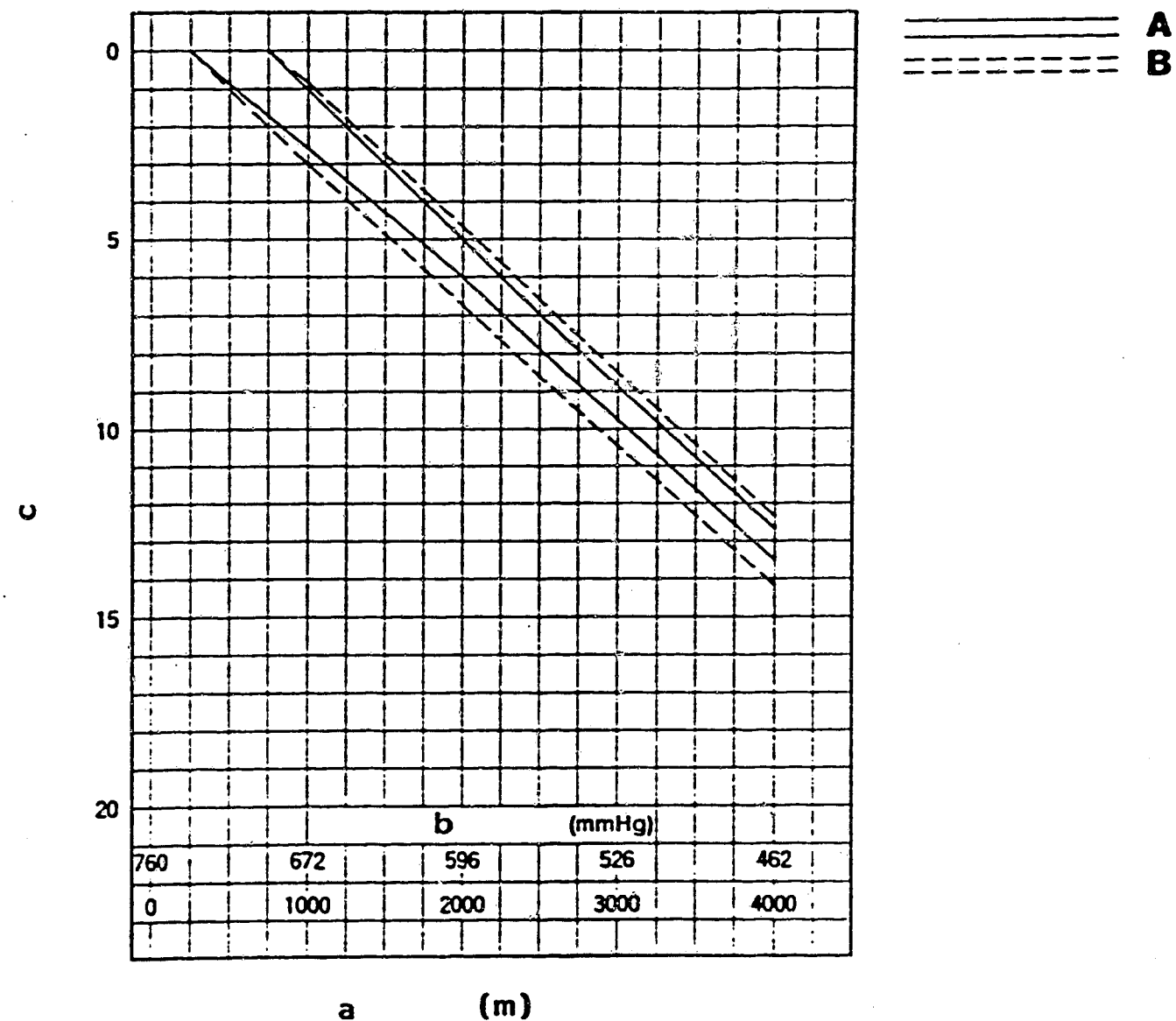


Figure 4

A = Adjustment limit  
 B = Inspection limit

104740-4660, 2/2

a = Altitude  
 b = Atmospheric pressure  
 c = Injection quantity decrease (cc/1000st)

■ FULL-LOAD FUEL INJECTION QUANTITY AND ACS ADJUSTING PROCEDURE AT HIGH ALTITUDES



1. FULL-LOAD FUEL INJECTION QUANTITY ADJUSTMENT

- 1) Remove the ACS cover, the bellows and the adjusting shims.
- 2) Perform all adjustments as described in the adjusting specifications, except for ACS adjustment.

2. ACS ADJUSTMENT

- 1) Attach the ACS cover, the bellows and the adjusting shims.
- 2) At a pump speed of 1000 rpm and referring to the graph above, use the shims to adjust the fuel injection quantity decrease according to the altitude.





Test oil		ZEXEL - TEST VALUES				1/2	
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 519	
SAE J967d		Engine model: TD27-T				ZEXEL No. 104740-7113	
						Date: 31.01.1992 [0]	
						Company: NISSAN DIESEL	
						No. 16700 80G07	
Injection pump no.: 104640-7113		(NP-VE4/10F2050RNP750)					
Pump rot.: Clockwise viewed from drive side		Test-nozzle holder combination:				Test pressure line:	
		1 688 901 000				1 680 750 017	
1. Setting values		P. Speed (rpm)	Settings *) S/T = Solenoid Timer			Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1100	*) S/T ON 4.0 - 4.8 (mm) OFF 2.1 - 2.5 (mm)			410 - 430 410 - 430	
1-2	Supply pump pressure	1100	S/T ON 5.6 - 6.4 (kg/cm²) OFF 4.0 - 4.6 (kg/cm²)			410 - 430 410 - 430	
1-3	Full load delivery	1100	61.8 - 62.8 (cc/1000st)			410 - 430	3.0
	Full load delivery	850	58.4 - 59.4 (cc/1000st)			240 - 260	
1-4	Idle speed regulation	375	6.4 - 10.4 (cc/1000st)			0	2.0
1-5	Start	100	45.0 - 80.0 (cc/1000st)			0	
1-6	Full-load speed regulation	2250	40.8 - 44.8 (cc/1000st)			410 - 430	
2. Test values							
2-1 Timing device		Solenoid timer N = rpm mm	ON 1100 3.9-4.9	OFF 1100 1700 2500 2.0-2.6 4.2-5.2 6.4-7.4			
2-2 Supply pump		N = rpm kg/cm²	1100 1700 5.6-6.4 7.4-8.2	1100 1700 4.0-4.6 5.8-6.4			
2-3 Overflow delivery		N = rpm cc/10s	1100 43.0-87.0	1100 without O-ring 60.0-103.0			
2-4 Fuel injection quantities							
Speed control lever pos.		P. Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop		1100	61.3 - 63.3	410 - 430			
		1100	47.0 - 52.0	0			
		850	57.9 - 59.9	240 - 260			
		2000	50.8 - 55.8	410 - 430			
		2150	47.5 - 53.5	410 - 430			
		2250	40.3 - 45.3	410 - 430			
		2500	11.9 - 20.9	410 - 430			
		2700	below 3.0	410 - 430			
Switch off		375	0	0			
Idle-stop		370 450	6.4 - 10.4 below 5.0	0 0			
2-5 Solenoid		Cut-in voltage max.: 8V Test voltage: 12 - 14V					

3. Dimensions		
K	3.2 - 3.7 mm	
KF	5.7 - 5.9 mm	
MS	0.8 - 1.0 mm	
BCS	3.4 - 3.6 mm	
Prestr.	- mm	
Control lever angle		
α	6° - 14° deg	
A	4.0 - 9.2 mm	
β	31° - 41° deg	
B	8.8 - 12.8 mm	
γ	- deg	
C	- mm	

C1

ZEXEL - Test specifications  
Injection pumps



C2

ZEXEL - Test specifications  
Injection pumps



**Note:**

- If there is no designation in the specifications for the Solenoid Timer's ON - OFF position, then the position should be regarded as OFF.
- When confirming timing device travel and supply pump pressure characteristics, apply boost pressure of 410 - 430 mmHg to the boost chamber.

■ **POTENTIOMETER ADJUSTMENT**

Under the following conditions, alter the potentiometer's installation position so that the out-put voltage equals the specified value.

Adjustment Conditions			Specified Value	Remarks
Control lever position	Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Out-put voltage (V)	
Measure	750	17.8 ± 1.0	4.0 ± 0.03	Adjust. point
Idle	-	-	-	Check point
Full speed	-	-	-	Check point

(In-put voltage: 10V)



Test Oil  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: 4D56

BOSCH No. 9 460 610 493  
ZEXEL No. 104740-8360  
Date: 31.01.1992 [0]  
Company: MITSUBISHI  
No. MD178626

Injection pump no.: 104640-8360

(NP-VE4/10F2100RNP1022)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:  
1 688 901 022

Test pressure line:  
1 680 750 073

1. Setting values		P. speed (rpm)	Setting values	Charge air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1000	3.5 - 3.9 (mm)	540 - 560	5.0
1-2	Supply pump pressure	1000	3.9 - 4.5 (kg.cm <sup>2</sup> )	540 - 560	
1-3	Full load delivery	2000 (FULL)	62.6 - 63.6 (cc/1000st)	540 - 560	
	Full load delivery	750 (BCS)	61.4 - 62.4 (cc/1000st)	320 - 340	2.0
1-4	Idle speed regulation	375	10.9 - 13.9 (cc/1000st)	0	
1-5	Start	100	67.0 - 87.0 (cc/1000st)	0	
1-6	Full-load speed regulation	*1 2650	24.9 - 30.9 (cc/1000st)	0	5.5
1-7	Load-timer adjustment	1000	T-0.5-0.9 (mm)	540 - 560	

## 2. Test values

		540 - 560 mmHg					
2-1 Timing device	Charge air pres. mmHg						
	N = rpm	500	1000	1250	1500	2000	2100
	mm	0.7-2.3	3.4-4.0	4.1-5.3	5.1-6.3	7.2-8.4	7.3-8.2
2-2 Supply pump	N = rpm		1000		1500		2100
	kg/cm <sup>2</sup>		3.9-4.5		5.1-5.7		6.5-7.1
2-3 Overflow delivery	N = rpm	1000					
	cc/10s	48.0-92.0					

## 2-4 Fuel injection quantities

Speed control lever pos.	Pump speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)
End stop	2000 (FULL)	62.1 - 64.1	540 - 560	
	750 (BCS)	60.9 - 62.9	320 - 340	
	600	44.0 - 49.0	0	
	1250	66.2 - 71.2	540 - 560	
	2100	60.5 - 63.5	540 - 560	
	2650	24.4 - 31.4	540 - 560	
	*1 2950	below 5.0	540 - 560	
Switch off	375	0	0	
Idle-stop	750	below 3.0	0	
	600	below 5.0	0	
	375	10.4 - 14.4	0	
Partial load	*2 750	33.7 - 36.7	0	
2-5 Solenoid	Cut-in voltage max.: 8V Test voltage: 12 - 14V			

## 3. Dimensions

K	3.2 - 3.4 mm
KF	5.7 - 5.9 mm
MS	0.6 - 0.8 mm
BCS	- mm
Pre-st.	- mm

## Control Lever Angle

α	55° - 63° Angle
A	8.3 - 14.8 mm
β	37° - 47° Angle
B	11.7 - 15.3 mm
γ	- Angle
C	- mm

C5

ZEXEL - Test specifications  
Injection pumps



C6

ZEXEL - Test specifications  
Injection pumps



# 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure: 540-560 mmHg  
 Pump Speed : 1000 rpm  
 Fuel Injection Quantity: 47.5 - 48.5 cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1-7).

# 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1000	47.0 - 49.0	540 - 560	-	0.4 - 1.0
1000	36.5 - 39.5	540 - 560	-	1.2 - 2.4

## Note:

For items marked \*, confirmation is as follows:

1. Insert the shims (1.0 mm thick) between the control lever and the full-speed stopper bolt.
2. Confirm the fuel injection quantity at the specified pump speed.



# **POTENTIOMETER ADJUSTMENT SPECIFICATIONS**

Adjustment Conditions			Specified Value	Remarks
Control lever position	Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Out-put voltage (V)	
Measure	750	$5 \pm 0.03$	$35.2 \pm 1$	Adjust. point
Idle	-	above 1	-	Check point
Full speed	-	(8.6)	-	Check point

(In-put voltage: 10V)

1. At a pump speed of 750 rpm, hold the control lever in a position where a fuel injection quantity of  $35.2 \pm 1$  mm<sup>3</sup>/st can be obtained.
2. Screw in the adjusting screw until it contacts the control lever and fix it using the locknut.
3. Adjust the potentiometer so that the output voltage is  $5.0 \pm 0.03$  V.
4. Following adjustment, remove the adjusting screw, hold the control lever in the idle position, and confirm that the potentiometer voltage is as described above.



Test oil  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: TD27

1/2

BOSCH No. 9 460 610 325  
ZEXEL No. 104740-9562  
Date: 31.01.1992 [0]  
Company: NISSAN DIESEL  
No. 16700 43G13

Injection pump no.: 104640-9562

(NP-VE4/10F2150RNP558)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

1. Setting values		P. speed (rpm)	Setting values	Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1700	4.7 - 5.1 (mm)		
1-2	Supply pump pressure	1700	5.6 - 6.2 (kg/cm <sup>2</sup> )		
1-3	Full load delivery	1100	51.8 - 52.8 (cc/1000st)		3.0
	Full load delivery		- (cc/1000st)		
1-4	Idle speed regulation	350	5.3 - 9.3 (cc/1000st)		2.0
1-5	Start	100	45.0 - 80.0 (cc/1000st)		
1-6	Full-load speed regulation	2350	31.0 - 35.0 (cc/1000st)		
1-7					

## 2. Test values

2-1 Timing device	N = rpm mm	1100 2.3- 2.9	1700 4.4-5.4		2550 6.8-7.8	
2-2 Supply pump	N = rpm kg/cm²	1100 4.1- 4.7	1700 5.6-6.2	2150 6.6-7.2		
2-3 Overflow delivery	N = rpm cc/10s	1100 43.0-87.0				
2-4 Fuel injection quantities						
Speed control lever pos.	Pump speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop	1100	51.3 - 53.3				
	600	50.8 - 54.8				
	2150	40.8 - 45.0				
	2350	30.5 - 35.5				
	2550	5.6 - 14.6				
	2700	below 5.0				
Switch off	350	0				
Idle- stop	350	5.3 - 9.3				
	450	below 3.0				
Partial load						
2-5 Solenoid	Cut-in voltage max.: 8V Test voltage: 12 - 14V					

## 3. Dimensions

K	3.2 - 3.4 mm
KF	5.7 - 5.9 mm
MS	0.8 - 1.0 mm
BCS	- mm
Pre-st.	- mm

### Control lever angle

α	35.5° - 43.5° deg
Ya	24.3 - 28.7 mm
β	31° - 41° deg
B	9.3 - 12.9 mm
γ	- deg
C	- mm

C11

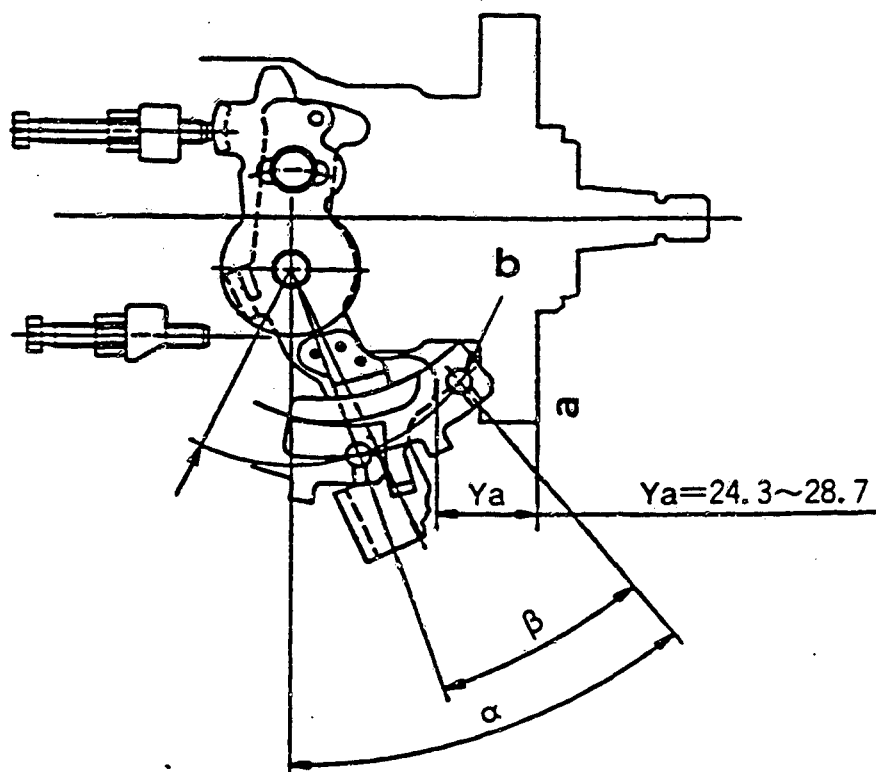
ZEXEL - Test specifications  
Injection pumps



C12

ZEXEL - Test specifications  
Injection pumps





104740-9562 2/2

Figure 5

a = End face of flange  
b = Hole "A"

#### ■ CONTROL LEVER ANGLE MEASUREMENT POSITION

1. Measure the control lever angles ( $\alpha$ ,  $\beta$ ,  $\gamma$ ) at hole "A".



Test oil  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: TD27

1/2  
BOSCH No. 9 460 610 327  
ZEXEL No. 104740-9592  
Date: 31.01.1992 [1]  
Company: NISSAN DIESEL  
No. 16700 43G16

Injection pump no.: 104640-9592

(NP-VE4/10F2150RNP561)

Pump rot.: Clockwise viewed from drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

1. Setting values		P. speed (rpm)	Setting values	Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1100	S/T ON 3.9 - 4.7 (mm) OFF 2.4 - 2.8 (mm)	*) S/T = Solenoid timer	3.0
1-2	Supply pump pressure	1100	S/T ON 4.5 - 5.3 (kg/cm <sup>2</sup> ) OFF 3.5 - 4.1 (kg/cm <sup>2</sup> )		
1-3	Full load delivery	1100	51.8 - 52.8 (cc/1000st)		
	Full load delivery		(cc/1000st)		2.0
1-4	Idle speed regulation	350	5.3 - 9.3 (cc/1000st)		
1-5	Start	100	45.0 - 80.0 (cc/1000st)		
1-6	Full-load speed regulation	2350	31.0 - 35.0 (cc/1000st)		
1-7					

## 2. Test values

	Solenoid timer	ON		OFF		
2-1 Timing device	N = rpm mm	1100 3.8-4.8		1100 2.3-2.9	1700 4.4-5.4	2550 6.8-7.8
2-2 Supply pump	N = rpm kg/cm²	1100 4.5-5.3	1700 5.9-6.7	1100 3.5-4.1	1700 4.9-5.5	2150 5.8-6.4
2-3 Overflow delivery	N = rpm <sup>-1</sup> cc/10s	1100 43.0-87.0	1100 without O-ring 60.0-103.0			
2-4 Fuel injection quantities						
Speed control lever pos.	P. speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop	1100	51.3 - 53.3				
	600	50.8 - 54.8				
	2150	40.8 - 45.0				
	2350	30.5 - 35.5				
	2550	5.6 - 14.6				
	2700	below 5.0				
Switch off	350	0				
Idle- stop	350	5.3 - 9.3				
	450	below 3.0				
2-5 Solenoid	Cut-in voltage max.: 8V Test voltage: 12 - 14V					

## 3. Dimensions

K	3.2 - 3.4 mm
KF	5.7 - 5.9 mm
MS	0.8 - 1.0 mm
BCS	- mm
Pre-str	- mm
Control lever angle	
α	51.5° - 59.5°deg
Ya	24.3 - 28.7 mm
β	31° - 41° deg
B	9.3 - 12.9 mm
γ	- deg
C	- mm

C14

ZEXEL - Test specifications  
Injection pumps



C15

ZEXEL - Test specifications  
Injection pumps





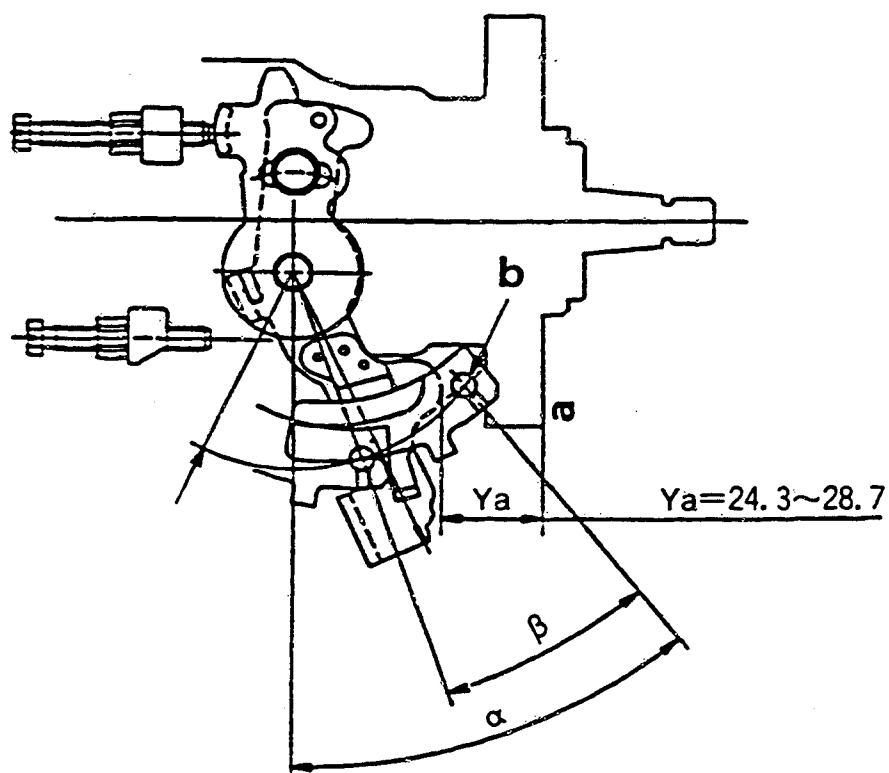


Figure 6

104740-9592 2/2

a = End face of flange  
b = Hole "A"

■ Control lever angle measurement position

1. Measure the control lever angles ( $\alpha$ ,  $\beta$ ,  $\gamma$ ) at hole A.





**Note:**

- After adjustment of full load fuel injection quantity (1250 rpm, 60.8 - 61.8 cc/1000st), set the boost pressure at 340 - 360 mmHg or (- kg/cm<sup>2</sup>), and at a pump speed of 1250 rpm adjust the fuel injection quantity using the BCS spring set screw.
  
- When confirming timing device travel, overflow delivery and supply pump pressure characteristics apply boost pressure of 590 - 610 mmHg to the boost chamber.
  
- Attach the timer's measuring device to the low pressure side.



Test oil:		ZEXEL - TEST VALUES				1/2	
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 394	
SAE J967d		Engine model: 4JB1CDT				ZEXEL No. 104741-1754	
						Date: 31.01.1992 [0]	
						Company: ISUZU	
						No. 8944751626	
Injection pump no : 104641-1744		(NP-VE4/11F1900RNP578)					
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:				Test pressure line:	
		1 688 901 000				1 680 750 017	
1. Test values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1700	5.0 - 5.4 (mm)			590 - 610	
1-2	Supply pump pressure	1700	5.2 - 5.6 (kg/cm²)			590 - 610	
1-3	Full load delivery	1250	63.2 - 64.2 (cc/1000st)			590 - 610	3.5
	Full load delivery	900	50.9 - 51.9 (cc/1000st)			340 - 360	4.5
1-4	Idle speed regulation	385	3.1 - 7.1 (cc/1000st)			0	2.0
1-5	Start	100	60.0 - 100.0 (cc/1000st)			0	
1-6	Full-load speed regulation	2300	19.3 - 25.4 (cc/1000st)			590 - 610	4.5
2. Test values							
		Solenoid timer	ON	OFF			
2-1	Timing device	N = rpm mm	550 above 0.5	1450 2.1 - 2.9	1700 4.9 - 5.5	1850 5.8 - 6.5	
2-2	Supply pump	N = rpm kg/cm²	500 4.0 - 6.0	500 above 6.0	1450 4.3 - 4.9	1700 5.2 - 5.6	1850 5.6 - 6.2
2-3	Overflow delivery	N = rpm cc/10s		1700 73 - 150			
2-4 Fuel injection quantities							
Speed control lever pos.		Pump Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop		1250	62.7 - 64.7	590 - 610			
		600	33.1 - 41.1	90 - 110			
		750	38.7 - 42.7	170 - 180			
		900	50.4 - 52.4	340 - 360			
		1800	54.6 - 61.6	590 - 610			
		2300	18.8 - 25.8	590 - 610			
		2500	below 5.0	590 - 610			
Switch off		385	0	0			
Idle stop		385	3.1 - 7.1	0			
		500	below 3.0	0			
2-5 Solenoid		Cut-in voltage max.: 8 V Test voltage: 12 - 14 V					

3. Dimensions		
K	2.7 - 2.9 mm	
KF	5.7 - 5.9 mm	
MS	0.8 - 1.0 mm	
BCS	4.4 - 4.6 mm	
Prestr.	- mm	
Control lever angle		
α	14° - 22° deg	
A	11.3 - 14.7 mm	
β	32° - 42° deg	
B	10.1 - 13.6 mm	
γ	- deg	
C	- mm	



**Note:**

- After adjustment of full load fuel injection quantity (1250 rpm, 63.2 - 64.2 cc/1000st), set the boost pressure at 340 - 360 mmHg or (- kg/cm<sup>2</sup>), and at a pump speed of 900 rpm adjust the fuel injection quantity using the BCS spring set screw.
- If there is no designation in the specifications for the Solenoid Timer's ON-OFF position, then the position should be regarded as OFF.
- When confirming timing device travel and supply pump pressure characteristics and overflow delivery, apply boost pressure of 590 - 610 mmHg to the boost chamber.
- Attach the timer's measuring device to the low pressure side.

- MICROSWITCH ADJUSTMENT

1. Fix the control lever in a position where the gap between the control lever and the idling stopper bolt is  $6.0 \pm 0.4$  mm (control lever angle:  $10^\circ - 15^\circ$ ).
2. Adjust the microswitch mounting position so that the microswitch turns OFF.

- V-FICD ADJUSTMENT

1. Adjust the bracket so that the clearance S is  $1 \pm 1$  mm.
2. Apply 400 mmHg negative pressure to the inside of the actuator and confirm that the actuator shaft moves the full stroke.

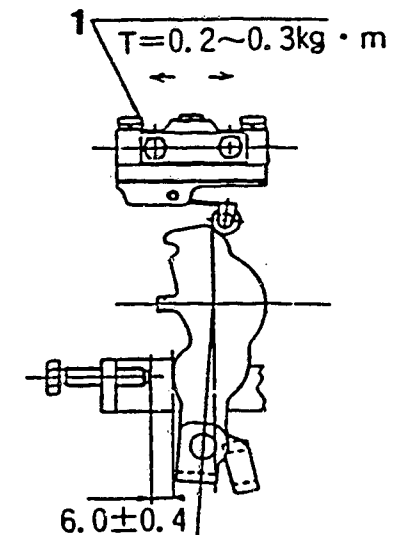
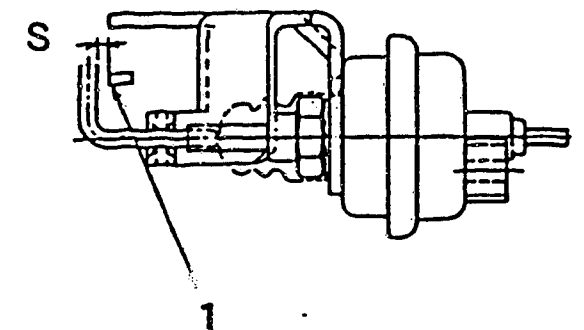


Figure 7

1 = Micro-switch fixing bolt

Figure 8

1 Control lever (idle position)



Test oil:		ZEXEL - TEST VALUES				1/2	
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 377	
SAE J967d		Engine model: 4JA1				ZEXEL No. 104741-6631	
						Date: 31.01.1992 [0]	
						Company: ISUZU	
						No. 8943820511	
Injection pump no.: 104641-6631		(NP-VE4/11F1900RNP856)					
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:				Test pressure line:	
		1 688 901 000				1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values		Charge-air pressure bar (mmHg)	Difference in delivery (cc)	
1-1	Time device travel	1600	5.3 - 5.7 (mm)			3.5	
1-2	Supply pump pressure	1600	4.8 - 5.2 (kg/cm²)				
1-3	Full load delivery	1150	43.8 - 44.8 (cc/1000st)				
	Full load delivery		(cc/1000st)				
1-4	Idle speed regulation	385	4.0 - 8.0 (cc/1000st)			2.0	
1-5	Start	100	60.0 - 100.0 (cc/1000st)				
1-6	Full-load speed regulation	2400	13.1 - 19.1 (cc/1000st)			4.5	
2. Test values							
2-1 Timing device		Solenoid timer N = rpm mm	ON 670 above 0.5	1000 0.6 - 1.4	OFF 1600 5.2 - 5.8	2000 7.4 - 8.2	
2-2 Supply pump		N = rpm kg/cm²			1600 4.8 - 5.2	2000 5.9 - 6.5	
2-3 Overflow delivery		N = rpm cc/10s	1600 62.0 - 105.0		1600 67 - 110		
2-4 Fuel delivery quantities							
Speed control lever pos.		Pump Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop		1150	43.3 - 45.3				
		500	26.0 - 33.0				
		700	31.9 - 36.9				
		1150	43.3 - 45.3				
		2400	12.6 - 19.6				
		2500	below 12.0				
Switch off		385	0				
Idle-stop		500	below 3.0				
		385	4.0 - 8.0				
2-5 Solenoid		Cut-in voltage max.: 8 V Test voltage: 12 - 14 V					
3. Dimensions							
K		2.7 - 2.9 mm					
KF		4.9 - 5.1 mm					
MS		0.9 - 1.1 mm					
BCS		- mm					
Prestr.		0.43 - 0.47 mm					
Control lever angle							
α		14° - 22° deg					
A		11.3 - 14.7 mm					
β		32° - 42° deg					
B		10.2 - 13.6 mm					
γ		- deg					
C		- mm					



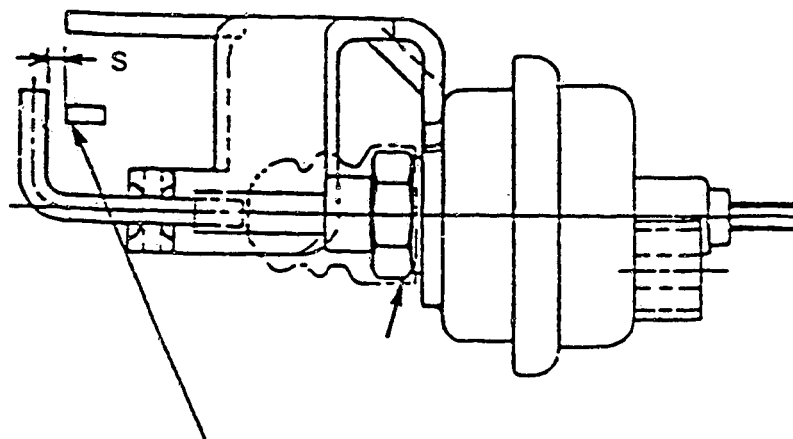


Figure 9

104741-6631 2/2

1 = Control lever  
(Idling position)

#### ■ V-FICD ADJUSTMENT

1. Adjust the bracket so that the clearance S is  $1^{+1}$  mm.
2. Apply 400 mmHg negative pressure to the inside of the actuator and confirm that the actuator shaft moves the full stroke.



Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributor pumps  
Engine model: 4JA1

1/2

BOSCH No. 9 460 610 378  
ZEXEL No. 104741-6641  
Date: 31.01.1992 [0]  
Company: ISUZU  
No. 8943820521

Injection pump no.: 104641-6631 (NP-VE4/11F1900RNP856)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

1. Setting values		P. Speed (rpm)	Setting values	Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Time device travel	1600	5.3 - 5.7 (mm)		
1-2	Supply pump pressure	1600	4.8 - 5.2 (kg/cm <sup>2</sup> )		
1-3	Full load delivery	1150	43.8 - 44.8 (cc/1000st)		3.5
	Full load delivery		(cc/1000st)		
1-4	Idle speed regulation	385	4.0 - 8.0 (cc/1000st)		2.0
1-5	Start	100	60.0 - 100.0 (cc/1000st)		
1-6	Full-load speed regulation	2400	13.1 - 19.1 (cc/1000st)		4.5

2. Test values

	Solenoid timer N = rpm mm	ON	OFF		
		670 above 0.5	1000 0.6 - 1.4	1600 5.2 - 5.8	2000 7.4 - 8.2
2-1 Timing device					
2-2 Supply pump	N = rpm kg/cm <sup>2</sup>			1600 4.8 - 5.2	2000 5.9 - 6.5
2-3 Overflow delivery	N = rpm cc/10s	1600 62.0 - 105.0		1600 67 - 110	

2-4 Fuel delivery quantities

Speed control lever pos.	Pump Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)
End stop	1150	43.3 - 45.3		
	500	26.0 - 33.0		
	700	31.9 - 36.9		
	1150	43.3 - 45.3		
	2400	12.6 - 19.6		
	2500	below 12.0		
Switch off	385	0		
Idle-stop	500	below 3.0		
	385	4.0 - 8.0		

2-5 Solenoid Cut-in voltage max.: 8 V  
Test voltage: 12 - 14 V

3. Dimensions

K	2.7 - 2.9 mm
KF	4.9 - 5.1 mm
MS	0.9 - 1.1 mm
BCS	- mm
Prestr.	0.43 - 0.47 mm
Control lever angle	
α	14° - 22° deg
A	11.3 - 14.7 mm
β	32° - 42° deg
B	10.2 - 13.6 mm
γ	- deg
C	- mm

D1

ZEXEL - Test specifications  
Injection pumps



D2

ZEXEL - Test specifications  
Injection pumps





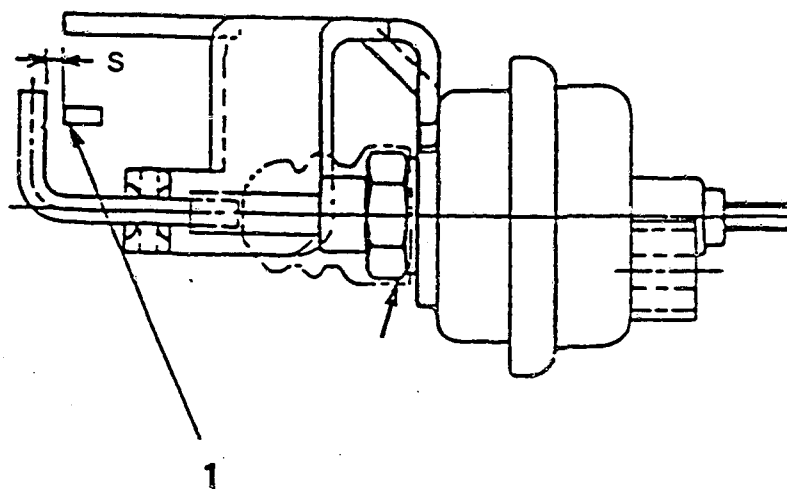


Figure 10

104741-6641 2/2

1 = Control lever  
(Idling position)

#### ■ V-FICD ADJUSTMENT

1. Adjust the bracket so that the clearance S is  $1^{+1}$  mm.
2. Apply 400 mmHg negative pressure to the inside of the actuator and confirm that the actuator shaft moves the full stroke.



Test oil:		ZEXEL - TEST VALUES			1/3	
ISO 4113 or		Distributor pumps			BOSCH No. 9 460 610 401	
SAE J967d		Engine model: S2			ZEXEL No. 104748-0052	
					Date: 31.01.1992 [0]	
					Company: MAZDA	
					No. S20113800C	
Injection pump no.: 104648-0052		(NP-VE4/8F2125LNP138)				
Pump rotation: Counter clockwise-viewed from drive side		Test-nozzle holder combination: 1 688 901 000			Test pressure line: 1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values		Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1250	4.0 - 4.4 (mm)			3.0
1-2	Supply pump pressure	1250	4.4 - 5.0 (kg/cm²)			
1-3	Full load delivery	1250	38.5 - 39.5 (cc/1000st)			
	Full load delivery		(cc/1000st)			
1-4	Idle speed regulation	325	5.2 - 9.2 (cc/1000st)			2.5
1-5	Start	100	above 4.0 (cc/1000st)			
1-6	Full-load speed regulation	2400	13.1 - 17.1 (cc/1000st)			4.0
1-7	Load-timer adjustment					
1-8						
2. Test values						
2-1 Timing device		N = rpm	1250	2125		
		mm	3.9 - 4.5	8.5 - 9.7		
2-2 Supply pump		N = rpm	500	1250	2125	
		kg/cm²	2.1 - 2.7	4.4 - 5.0	6.9 - 7.5	
2-3 Overflow delivery		N = rpm	1250			
		cc/10s	52.0 - 95.0			
2-4 Fuel injection quantities						
Control lever position		Pump speed (rpm)	Fuel delivery (cc/1000 strokes)	Charge-air pres (mmHg)	Difference in delivery (cc)	
End stop		1250	38.0 - 40.0			
		500	32.6 - 36.6			
		2125	32.2 - 37.2			
		2400	12.1 - 18.1			
		2500	below 10.0			
Switch off		325	0			
Idle stop		325	5.2 - 9.2			
		below 470	0			
2-5 Solenoid		Cut-in voltage max. 8 V				
		Test voltage: 12 - 14 V				
3. Dimensions						
K	3.2 - 3.4 mm					
KF	5.7 - 5.9 mm					
MS	1.7 - 1.9 mm					
BCS	- mm					
Pre-st.	- mm					
Control lever angle						
α	31° - 39° deg					
A	2.5 - 7.7 mm					
β	45° - 55° deg					
B	12.8 - 16.8 mm					
γ	- deg					
C	- mm					

D4

ZEXEL - Test specifications  
Injection pumps



D5

ZEXEL - Test specifications  
Injection pumps



**1. Fixing the M-CSD Stopper**

- 1) Fix the M-CSD assembly temporarily to the pump housing.
- 2) Turn the drive shaft at least two turns in the direction of pump rotation.
- 3) Turn the drive shaft slowly, and fix the drive shaft in a position where a load is applied (the point where the roller in the roller holder contacts the cam surface of the cam disc).
- 4) Move the CSD lever to the advance side.
- 5) Fix the CSD lever in the position where the ball pin at the tip of the shaft lightly contacts the roller holder (roller holder advance angle "0").
- 6) Adjust the adjusting screw so that the gap "a" between the CSD lever and the stopper is 0.5±2 mm.
- 7) After adjustment, tighten the M-CSD screw to the specified torque (T).

$$T = 0.6 - 0.9 \text{ kpm}$$

**2. Fixing the CSD Lever Plate**

- 1) Fix the CSD lever in a position where the gap "a" between the CSD lever and the stopper is 0 mm.
- 2) Adjust the plate position so that the gap "b" between the intermediate lever roller and the CSD lever plate is 0.5 mm.  
After adjustment, fix the plate in this position with the two screws.

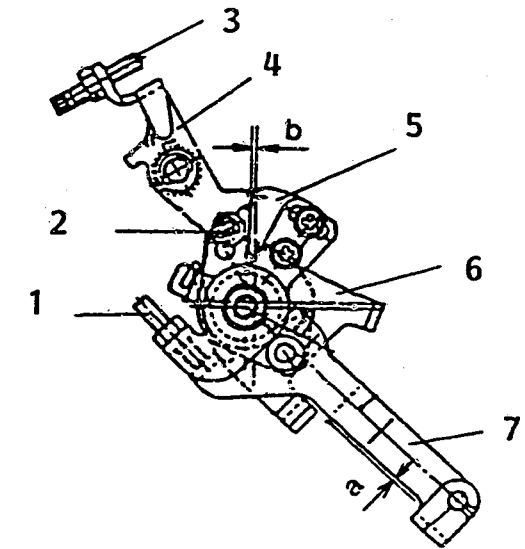


Figure 11

- 1 = Adjusting screw
- 2 = Roller holder
- 3 = FICD Screw
- 4 = Intermediate lever
- 5 = Plate
- 6 = Stopper
- 7 = CSD Lever



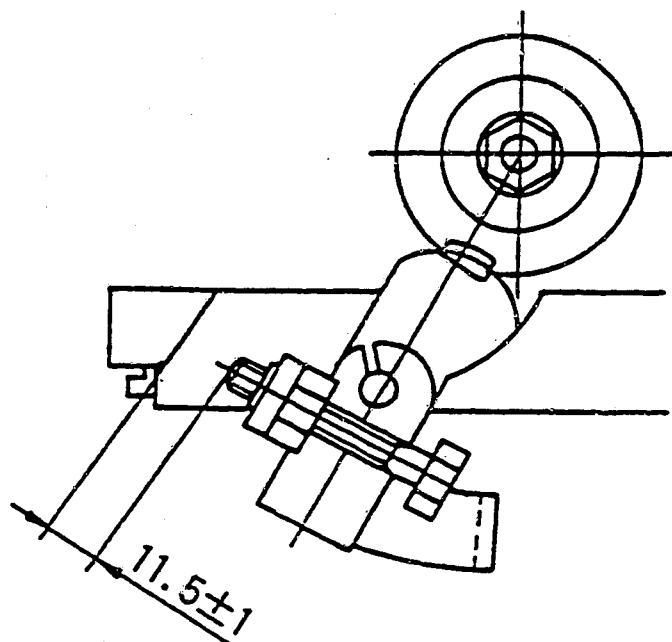


Figure 12

104748-0052 3/3

### 3. FICD Screw Adjustment

- 1) Move the CSD lever so that it contacts the stopper.
- 2) Insert a block gauge (thickness gauge) of  $11.5 \pm 1$  mm thickness between the control lever and the idling stopper bolt.  
(To position the control lever  $13^\circ$  from the idling position)
- 3) Adjust the FICD screw so that the control lever and the FICD screw are in contact.



Test oil:		ZEXEL - TEST VALUES				1/4	
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 402	
SAE J967d		Engine model: RF				ZEXEL No. 104748-0346	
						Date: 31.01.1992 [0]	
						Company: MAZDA	
						No. RF7913800D	
Injection pump no.: 104648-0356		(NP-VE4/8F2325RNP580)					
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:				Test pressure line:	
		1 688 901 000				1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Time device travel	1375	4.0 - 4.4 (mm)				2.5
1-2	Supply pump pressure	1375	4.4 - 5.0 (kg/cm²)				
1-3	Full load delivery	1375	35.4 - 36.4 (cc/1000st)				
	Full load delivery		(cc/1000st)				
1-4	Idle speed regulation	360	9.0 - 11.0 (cc/1000st)				2.0
1-5	Start	100	above 42.0 (cc/1000st)				
1-6	Full-load speed regulation	2600	10.8 - 14.8 (cc/1000st)				
1-7	Load-timer Adjustment	1375	3.4 - 3.8 (mm)				
2. Test values							
2-1 Timing device	N = rpm		1375	1800	2325		
	mm		3.9- 4.5	6.1-7.3	7.2-8.4		
2-2 Supply pump	N = rpm	600	1375	1800	2325		
	kg/cm²	2.2-2.8	4.4- 5.0	5.6-6.2	6.9-7.5		
2-3 Overflow delivery	N = rpm		1375				
	cc/10s		46.3-90.3				
2-4 Fuel delivery quantities							
Speed control lever pos.	Pump speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)			
End stop	1375	34.9 - 36.9					
	600	29.0 - 33.0					
	2325	30.2 - 34.2					
	2600	9.8 - 15.8					
	2700	below 6.0					
Switch off	360	0					
Idle-stop	360	8.0 - 12.0					
2-5 Solenoid	Cut-in voltage max.: 8 V Test voltage: 12 - 14 V						
3. Dimensions							
K	3.2 - 3.4 mm						
KF	5.7 - 5.9 mm						
MS	1.4 - 1.6 mm						
BCS	- mm						
Prestr.	- mm						
Control lever angle							
α	21°- 29° deg						
A	8.8 - 14.1 mm						
β	40°- 50° deg						
B	12.7 - 16.0 mm						
γ	- deg						
C	- mm						



## 1. Adjustment

- 1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure: - mmHg  
 Pump Speed : 1375 rpm  
 Fuel Injection Quantity:  $28.2 \pm 1$  cc/1000st

- 2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (Item 1-7).

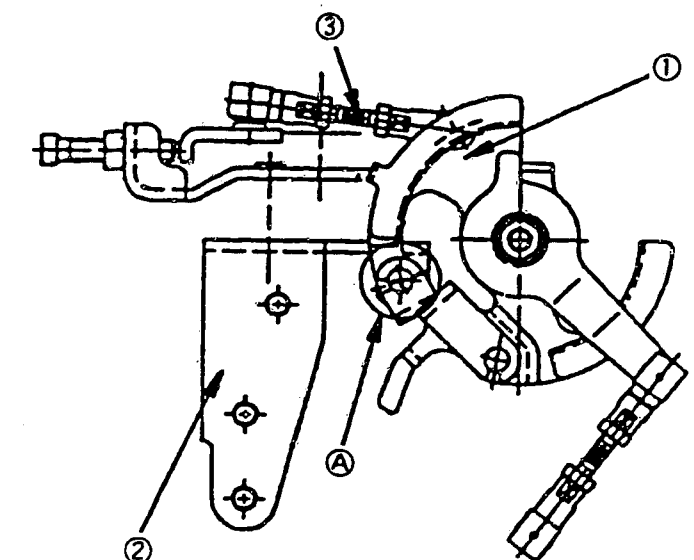
## 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1375	$28.2 \pm 1.5$	-	$3.6 \pm 0.3$	-
1375	$16.1 \pm 1.5$	-	$2.4 \pm 0.7$	-

Figure 13

1 = Side link lever  
 2 = Bracket  
 3 = Connecting rod



## SIDE LINK LEVER ADJUSTMENT

- Fix the control lever in the idling position.
- Adjust the connecting rod (3) so that the pin (diameter 5.8 -0.2 mm) is inserted through both the bracket (2) hole and the side link lever (1) hole (section A) to align them.  
 Then, fix the connecting rod using the nuts.



## W-CSD ADJUSTMENT

### 1. Timer Stroke Adjustment

- 1) Calculate the timer stroke from Fig. 15 according to the atmospheric temperature at the time of adjustment.
- 2) Adjust using the screw (1) so that the timer stroke is as calculated in step 1.

### 2. W-FICD Adjustment

- 1) Adjust using the screw (2) so that the screw (2) length (dimension  $l$ ) is  $12.3 \pm 0.5$  mm.

### 3. Dimension $l$ Adjustment

- 1) Calculate the gap ( $l$ ) between the micro switch and the control lever from Fig. 15 according to the atmospheric temperature at the time of adjustment.
- 2) Adjust using the turn bacle so that the gap ( $l$ ) between the micro switch and the control lever is as calculated in step 1.

Formula for calculating Timer Stroke:

$$TA = -0.04 t + 2.4 \quad (t \geq 0^\circ\text{C})$$

Formula for calculating control lever  
and micro switch gap:

$$l = -0.072 t + 3.6 \quad (t \geq 0^\circ\text{C})$$

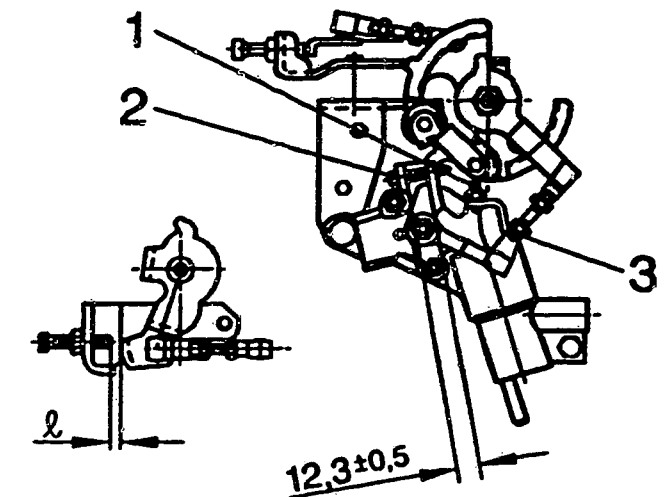
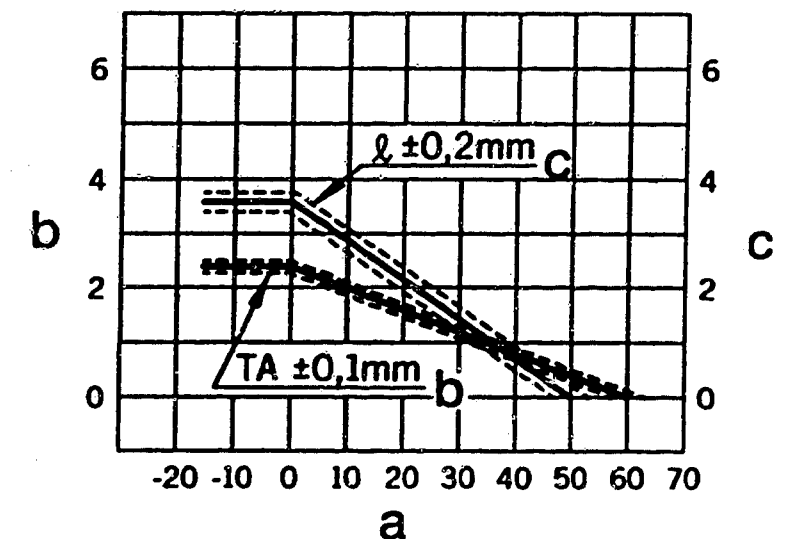


Figure 14

Figure 15

a = Atmospheric temperature  
b = Timer stroke (TA mm)  
c = Gap between control lever  
and idling stopper bolt ( $l$  mm)



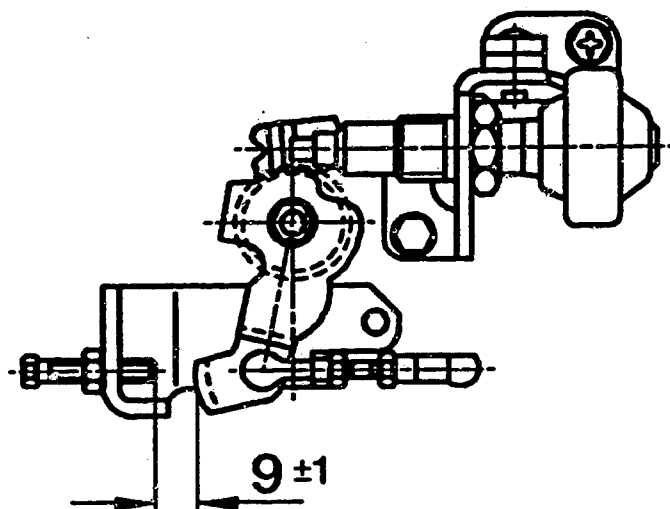


Figure 16

104748-0346 4/4

#### ■ DASH POT ADJUSTMENT

1. Insert a block gauge (thickness gauge) of thickness  $9 \pm 1$  mm in the gap between the control lever and the idling stopper bolt.  
(Control lever angle:  $13^\circ$ )
2. Adjust the dashpot adjusting screw so that the dashpot adjusting screw and the pushrod are in contact.  
Fix the screw using the nut.





Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: CD17

Injection pump no.: 104648-2411

(NP-VE4/8F2500LNP374)

Pump rotation.: Counter clockwise-viewed  
from drive side

Test-nozzle holder combination:  
1 688 901 000

1. Setting values

1-1

Timing device travel

1-2

Supply pump pressure

1-3

Full load delivery

1-4

Idle speed regulation

1-5

Start

1-6

Full-load speed regulation

1-7

P. Speed  
(rpm)

1200

1200

1000

360

100

2700

Setting values

1.5 - 2.1 (mm)

3.1 - 3.7 (kg/cm²)

27.1 - 29.1 (cc/1000st)

(cc/1000st)

3.7 - 6.7 (cc/1000st)

50.3 - 60.3 (cc/1000st)

11.8 - 17.8 (cc/1000st)

Charge-air pressure  
bar (mmHg)

Difference in  
delivery (cc)

2.5

2. Test values

2-1 Timing device

N = rpm  
mm

1200

1.4 - 2.2

1800

3.5 - 4.7

2500

6.9 - 7.8

2-2 Supply pump

N = rpm  
kg/cm²

1200

3.0 - 3.8

1800

4.4 - 5.2

2500

6.1 - 6.9

2-3 Overflow delivery

N = rpm  
cc/10s

1200

36.0 - 80.0

2-4 Fuel injection quantities

Control lever position

Pump Speed  
(rpm)

Fuel delivery  
(cc/1000 strokes)

Charge-air  
pres (mmHg)

Difference in  
delivery (cc)

End stop

1000

26.6 - 28.6

600

24.8 - 28.8

2500

24.3 - 28.3

2700

11.3 - 18.3

2900

below 6.0

Switch off

360

0

Idle

360

3.2 - 7.2

2.5

stop

600

below 3.0

Partial load

700

10.8 - 19.8

2-5

Cut-in voltage max.: 8V

Solenoid

Test voltage: 12 - 14V

1/4

BOSCH No. 9 460 610 333

ZEXEL No. 104748-2411

Date: 31.01.1992 [2]

Company: NISSAN

No. 16700 54A00

3. Dimensions

K

3.2 - 3.4 mm

KF

5.7 - 5.9 mm

MS

1.5 - 1.7 mm

BCS

- mm

Pre-str.

- mm

Control lever angle

α

1° - -1° deg

YA

15.4 - 18.1 mm

β

39° - 49° deg

B

11.0 - 16.0 mm

γ

13.5° - 14.5°deg

C

8.6 - 9.2 mm

D16

ZEXEL - Test specifications  
Injection pumps

D17

ZEXEL - Test specifications  
Injection pumps

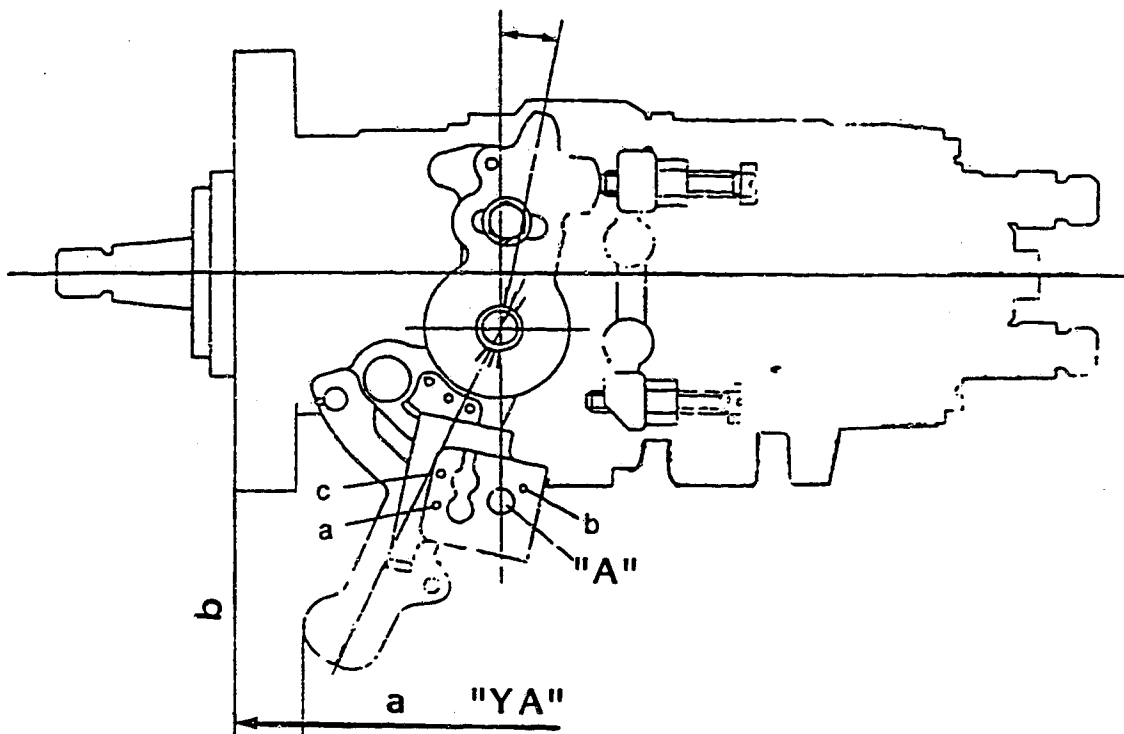


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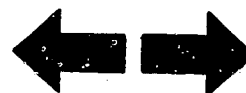
104748-2411 2/4

a = Measurement position  
b = End face of flange

"A" = Hole

■ CONTROL LEVER ANGLE MEASUREMENT POSITION

1. Measure the control lever angles ( $\alpha$ ,  $\beta$ ,  $\gamma$ ) at hole "A".



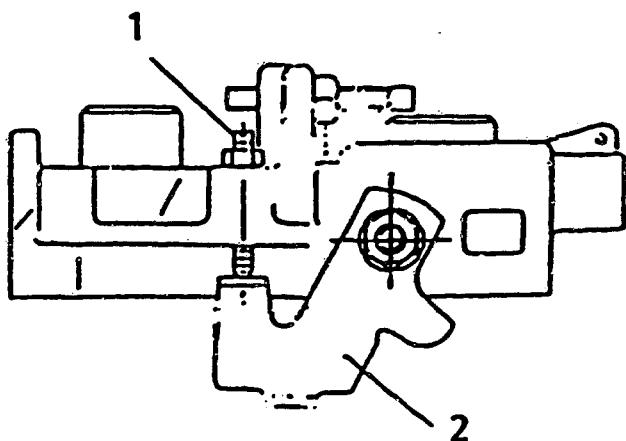


Figure 18

104748-2411 2/4  
(Continued)

- 1 = Adjusting screw
- 2 = Stop lever

■ STARTING INJECTION QUANTITY ADJUSTMENT

Adjust the starting injection quantity  
(item 1-5) using the adjusting screw  
(as shown in the figure above).



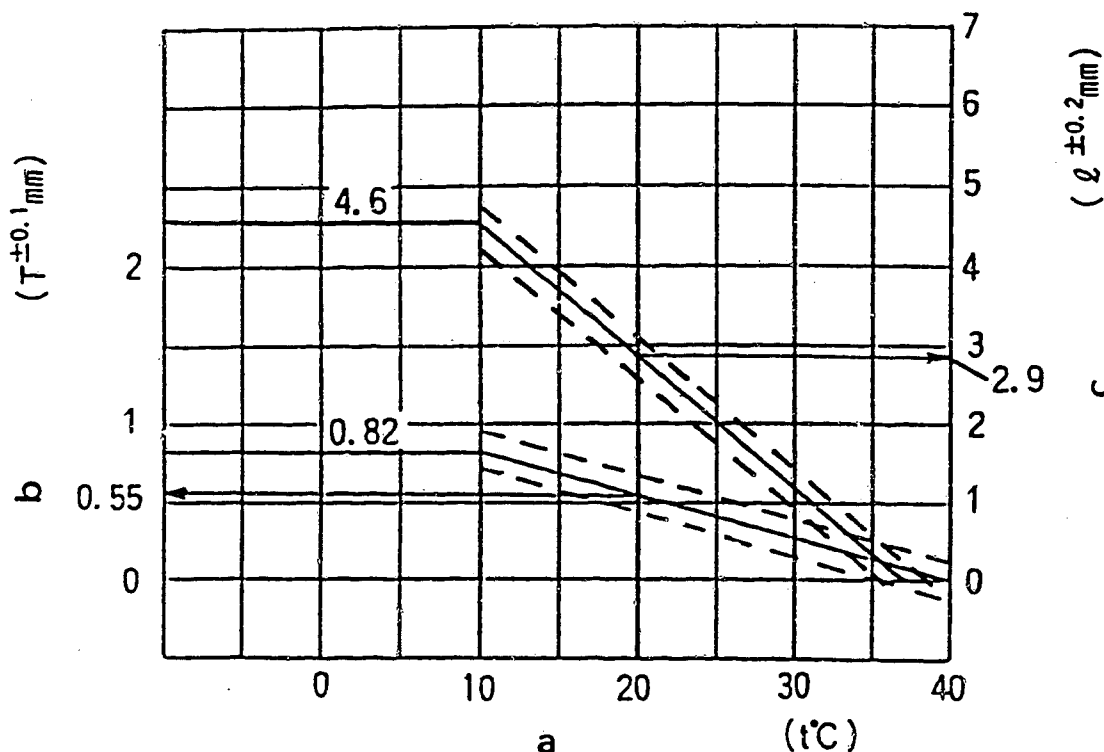


Figure 19

104748-2411 3/4

- a = Atmospheric temperature
- b = Timer stroke
- c = Gap between control lever and idling stopper bolt

## ■ W-CSD ADJUSTMENT

### 1. Timer Stroke Adjustment

- 1) Calculate the timer stroke from Fig. 19 (diagram) according to the atmospheric temperature at the time of adjustment.
- 2) Adjust using the timer stroke adjusting screw so that the timer stroke is as calculated in Step 1).



(Continued)

Formula for calculating Timer Stroke (Diagram):

$$\text{When } 10 \leq t \leq 20 \quad T = -0.027 t + 1.09$$

$$\text{When } 20 \leq t \leq 40 \quad T = -0.0275 t + 1.1$$

Formula for calculating control lever and idling stopper bolt gap:

$$\text{When } 10 \leq t \leq 20 \quad l = -0.178 t + 6.3$$

$$\text{When } 20 \leq t \leq 28.5 \quad l = -0.235 t + 7.6$$

$$\text{When } 28.5 \leq t \leq 36 \quad l = -0.12 t + 4.32$$



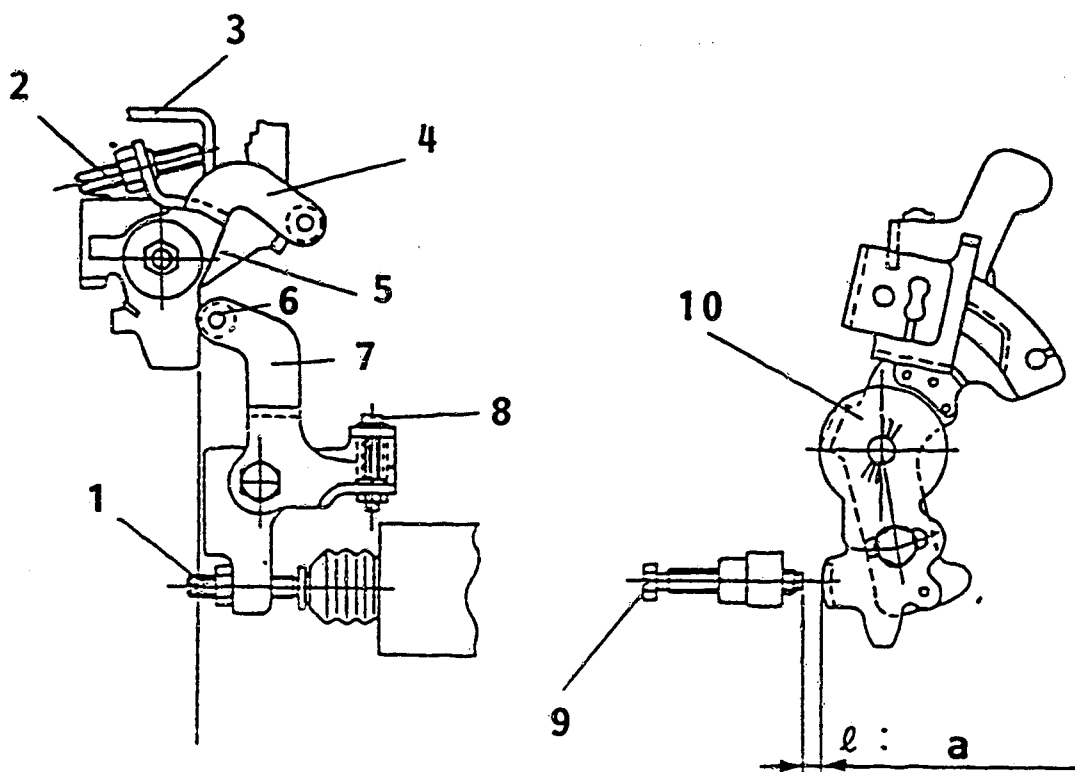


Figure 20

104748-2411 4/4

- 1 = Timer stroke adjusting screw
- 2 = Intermediate lever set screw
- 3 = Control lever
- 4 = Intermediate lever
- 5 = Aligning mark
- 6 = Roller
- 7 = CSD lever
- 8 = Idling adjusting screw
  
- 9 = Idling stopper bolt
- 10 = Control lever
  
- a = Block gauge

## 2. Intermediate Lever Position Adjustment



## 2. Intermediate Lever Position Adjustment (continued)

- 1) Insert a block gauge (thickness gauge) of  $4.1 \pm 0.05$  mm thickness between the control lever and the idling stopper bolt.
- 2) Align the intermediate lever with the aligning mark.
- 3) Adjust the intermediate lever set screw so that the control lever and the intermediate lever set screw are in contact, and then fix in position using the locknut.

## 3. CSD Lever Adjustment

- 1) Calculate the block gauge dimension  $l \pm 0.05$  mm from (Fig. 19) according to the atmospheric temperature at the time of adjustment.
- 2) Insert the block gauge (thickness gauge) (selected in Fig. 19) between the bracket and the idling stopper bolt.  
Fix the screw using the nut.
- 3) Using the idling bolt, adjust so that the CSD lever roller and the intermediate lever are in contact.

### Note:

- The temperature of the wax must be below 30°C when adjusting.
- When inserting a block gauge (thickness gauge) between the control lever (bracket) and the idling stopper bolt, use the idling adjusting bolt to separate the CSD lever and the intermediate lever so that no excessive force is exerted on them.



Test oil:		ZEXEL - TEST VALUES				1/4	
ISO 4113 or		Distributors pumps				BOSCH No. 9 460 610 385	
SAE J967d		Engine model: CD17				ZEXEL No. 104748-2630	
						Date: 31.01.1992 [0]	
						Company: NISSAN	
						No. 16700 54A03	
Injection pump no.: 104648-2630		(NP-VE4/8F2500LNP715)					
Pump rotation.: Counter clockwise-viewed from drive side		Test-nozzle holder combination: 1 688 901 000		Test pressure line: 1 680 750 017			
1. Setting values		P. Speed (rpm)	Setting values		Charge-air pressure bar (mmHg)		Difference in delivery (cc)
1-1	Timing device travel	1200	1.5 - 2.1 (mm)				2.5
1-2	Supply pump pressure	1200	3.1 - 3.7 (kg/cm²)				
1-3	Full load delivery	1000	27.1 - 28.1 (cc/1000st)				
	Full load delivery		(cc/1000st)				
1-4	Idle speed regulation	360	3.7 - 6.7 (cc/1000st)				
1-5	Start	100	50.3 - 70.3 (cc/1000st)				
1-6	Full-load speed regulation	2700	11.8 - 17.8 (cc/1000st)				
1-7							
2. Test values							
2-1 Timing device		N = rpm mm	1200 1.4 - 2.2	1800 3.5 - 4.7	2500 6.9 - 7.8	3. Dimensions	
2-2 Supply pump		N = rpm kg/cm²	1200 3.0 - 3.8	1800 4.4 - 5.2	2500 6.1 - 6.9		
2-3 Overflow delivery		N = rpm cc/10s	1200 36.0 - 80.0				
2-4 Fuel injection quantities							
Control lever position		Pump Speed (rpm)	Fuel delivery (cc/1000 strokes)	Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop		1000	26.6 - 28.6				
		600	24.8 - 28.8				
		2500	24.3 - 28.3				
		2700	11.3 - 19.3				
		2900	below 6.0				
Switch off		360	0				
Idle stop		360	3.2 - 7.2		2.5		
		600	below 3.0				
Partial load		700	10.8 - 19.8				
2-5 Solenoid		Cut-in voltage max.: 8V Test voltage: 12 - 14V					

E1

ZEXEL - Test specifications  
Injection pumps



E2

ZEXEL - Test specifications  
Injection pumps





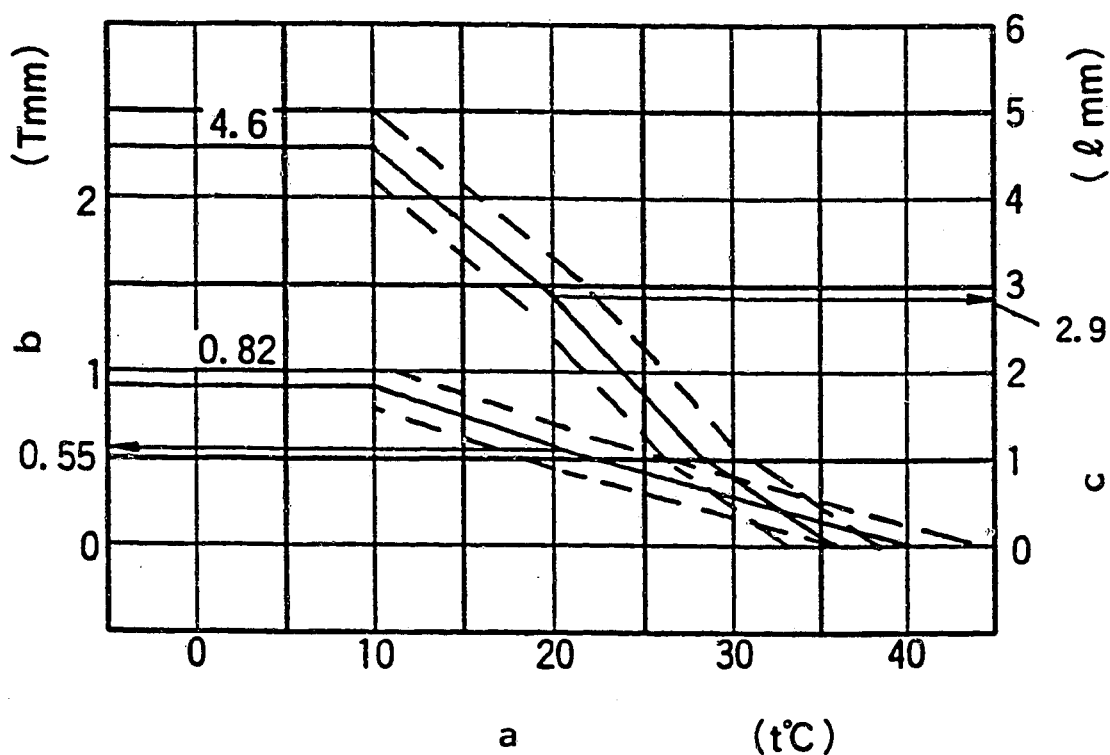


Figure 21

104748-2630 2/4

- a = Atmospheric temperature
- b = Timer stroke
- c = Gap between control lever and idling stopper bolt

#### ■ W-CSD ADJUSTMENT

##### 1. Timer Stroke Adjustment

- 1) Calculate the timer stroke from Fig. 21 (diagram) according to the atmospheric temperature at the time of adjustment.
- 2) Adjust using the timer stroke adjusting screw (1) so that the timer stroke is as calculated in Step 1).



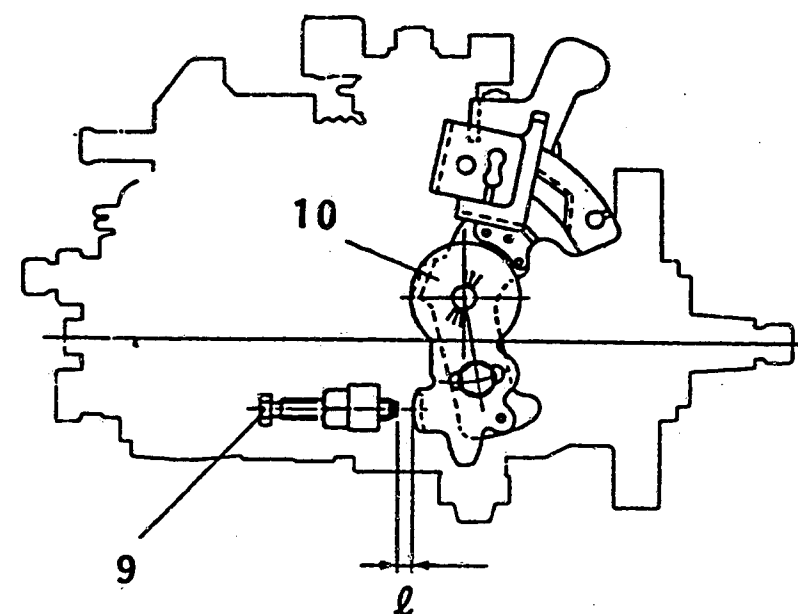
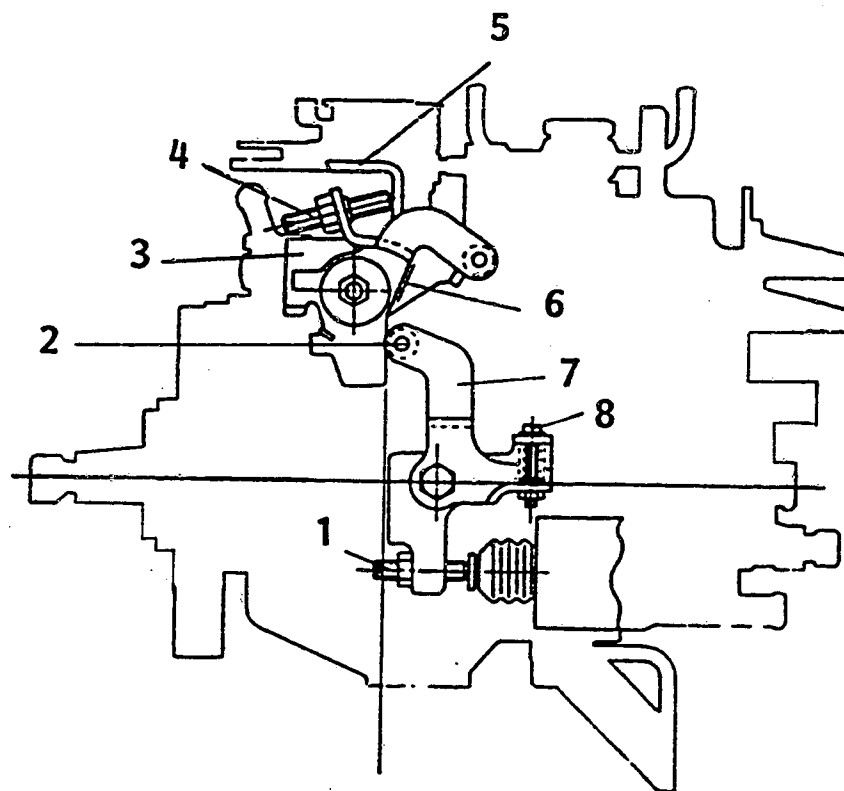


Figure 22

104748-2630 4/4

- 1 = Timer stroke adjusting screw
- 2 = Roller
- 3 = Intermediate lever
- 4 = Intermediate lever set screw

- 5 = Control lever
- 6 = Aligning mark
- 7 = CSD lever
- 8 = Idling adjusting screw

- 9 = Idling stopper bolt
- 10 = Control lever

## 2. Intermediate Lever Position Adjustment (continued)

- 1) Insert a block gauge (thickness gauge) of 4.05 - 4.15 mm thickness between the control lever and the idling stopper bolt.
- 2) Align the intermediate lever with the aligning mark.
- 3) Adjust the intermediate lever set screw so that the control lever and the intermediate lever set screw are in contact, and then fix in position using the locknut.

E4

ZEXEL - Test specifications  
Injection pumps



E5

ZEXEL - Test specifications  
Injection pumps



### 3. CSD Lever Adjustment (adjust to the thick line)

- 1) Calculate the block gauge dimension  $l \pm 0.05$  mm from (Fig. 21) according to the atmospheric temperature at the time of adjustment.
- 2) Insert the block gauge (thickness gauge) between the control lever and the idling stopper bolt.
- 3) Using the idling bolt, adjust so that the CSD lever roller and the intermediate lever are in contact.

**Note:**

- The temperature of the wax must be below 30°C when adjusting.
- When inserting a block gauge (thickness gauge) between the control lever (bracket) and the idling stopper bolt, use the idling adjusting bolt to separate the CSD lever and the intermediate lever so that no excessive force is exerted on them.



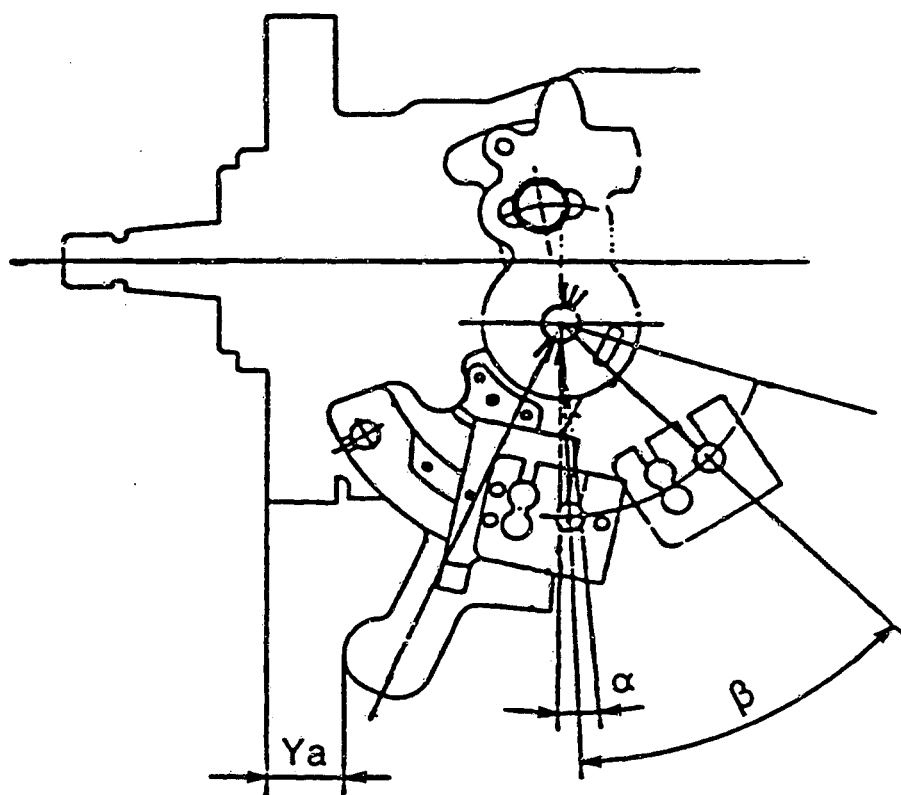


Bild 23

104748-2630 4/4

■ CONTROL LEVER ANGLE MEASUREMENT POSITION

1. Measure the control lever angles ( $\alpha$ ,  $\beta$ ,  $\gamma$ ) at hole "A".



Test oil:		ZEXEL - TEST VALUES			BOSCH No. 9 460 610 507	
ISO 4113 or		Distributors pumps			ZEXEL No. 104749-0312	
SAE J967d		Engine model: S2			Date: 31.01.1992 [0]	
					Company: MAZDA	
					No. 483813800A	
Injection pump no.: 104649-0312		(NP-VE4/9F2125LNP372)				
Pump rotation.: Counter clockwise-viewed from drive side		Test-nozzle holder combination: 1 688 901 000			Test pressure line: 1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values		Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1250	1.3 - 1.7 (mm)			2.5
1-2	Supply pump pressure	1250	3.8 - 4.4 (kg/cm²)			
1-3	Full load delivery	1500	40.0 - 41.0 (cc/1000st)			
	Full load delivery		(cc/1000st)			
1-4	Idle speed regulation	325	5.2 - 9.2 (cc/1000st)			2.5
1-5	Start	100	above 65.0 (cc/1000st)			
1-6	Full-load speed regulation	2400	9.6 - 13.6 (cc/1000st)			
1-7						
2. Test values						
2-1 Timing device		N = rpm	1250	1500	2125	3. Dimensions
		mm	1.2 - 1.8	2.8 - 4.0	8.2 - 9.4	
2-2 Supply pump		N = rpm	500	1250	2125	
		kg/cm²	1.3 - 1.9	3.8 - 4.4	6.8 - 7.4	
2-3 Overflow delivery		N = rpm	1250			
		cc/10s	53.0 - 97.0			
2-4 Fuel injection quantities						
Control lever position	Pump Speed (rpm)	Fuel delivery (cc/1000 strokes)	Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop	1500	39.5 - 41.5				
	500	30.5 - 34.5				
	2125	33.4 - 37.4				
	2400	8.6 - 14.6				
	2500	below 8.6				
Switch off	325	0				
	325	When the stop lever operated Q = 0				
Idle stop	325	5.2 - 9.2				
	below 430	0				
2-5 Solenoid	Cut-in voltage max.: 8V Test voltage: 12 - 14V					

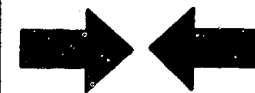
E8

ZEXEL - Test specifications  
Injection pumps



E9

ZEXEL - Test specifications  
Injection pumps



Test oil		ZEXEL - TEST VALUES				1/4	
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 502	
SAE J967d		Engine model: RFX				ZEXEL No. 104749-0470	
						Date: 31.01.1992 [0]	
						Company: MAZDA	
						No. RF7113800E	
Injection pump no.: 104649-0470		(NP-VE4/9F2150RNP556)					
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination: 1 688 901 000				Test pressure line: 1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1500	4.4 - 4.8 (mm)			640 - 660	
1-2	Supply pump pressure	1500	5.2 - 5.8 (kg/cm²)			640 - 660	
1-3	Full load delivery	1000 FULL	48.7 - 49.7 (cc/1000st)			640 - 660	4.0
	Full load delivery	1000 BCS	44.7 - 45.7 (cc/1000st)			290 - 310	3.5
1-4	Idle speed regulation	360	8.0 - 10.0 (cc/1000st)			0	2.0
1-5	Start	100	above 55.0 (cc/1000st)			0	
1-6	Full-load speed regulation	2250	33.2 - 37.2 (cc/1000st)			640 - 660	
1-7	Load-timer adjustment	1500	T-0.2-0.6 (mm)			640 - 660	
2. Test values							
2-1	Timing device	N = rpm mm	750 below 1.1	1250 2.7-3.9	1500 4.3-4.9		
2-2	Supply pump	N = rpm kg/cm²			1500 5.2-5.8	2150 6.8-7.4	
2-3	Overflow delivery	N = rpm cc/10s	1000 41.0-85.0				
2-4 Fuel injection quantities							
Speed control lever pos.		Pump speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop		1000 FULL	48.2 - 50.2	640 - 660			
		1000 BCS	44.2 - 46.2	290 - 310			
		600	33.5 - 38.5	0			
		2150	38.6 - 43.6	640 - 660			
		2250	32.7 - 37.7	640 - 660			
		2550	8.0 - 15.0	640 - 660			
		2700	below 3.0	640 - 660			
Switch off		360	0	0			
Idle-stop		450	below 3.0	0			
		360	8.0 - 10.0	0			
2-5 Solenoid		Cut-in voltage max. 8 V Test voltage: 12 - 14 V					
3. Dimensions							
K	3.2 - 3.4 mm						
KF	5.7 - 5.9 mm						
MS	1.6 - 1.8 mm						
BCS	3.9 - 4.1 mm						
Pre-st.	0.28 - 0.32 mm						
Control lever angle							
α	21° - 29° deg						
A	8.8 - 14.1 mm						
β	39° - 55° deg						
B	12.3 - 14.2 mm						
γ	- deg						
C	- mm						



1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure: 640 - 660 mmHg  
 Pump Speed : 1500 rpm  
 Fuel Injection Quantity: 34.5 - 35.5 cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1 - 7).

2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
1500	34.0 - 36.0	640 - 660	-	0.1 - 0.7
1500	28.5 - 31.5	640 - 660	-	0.4 - 1.2



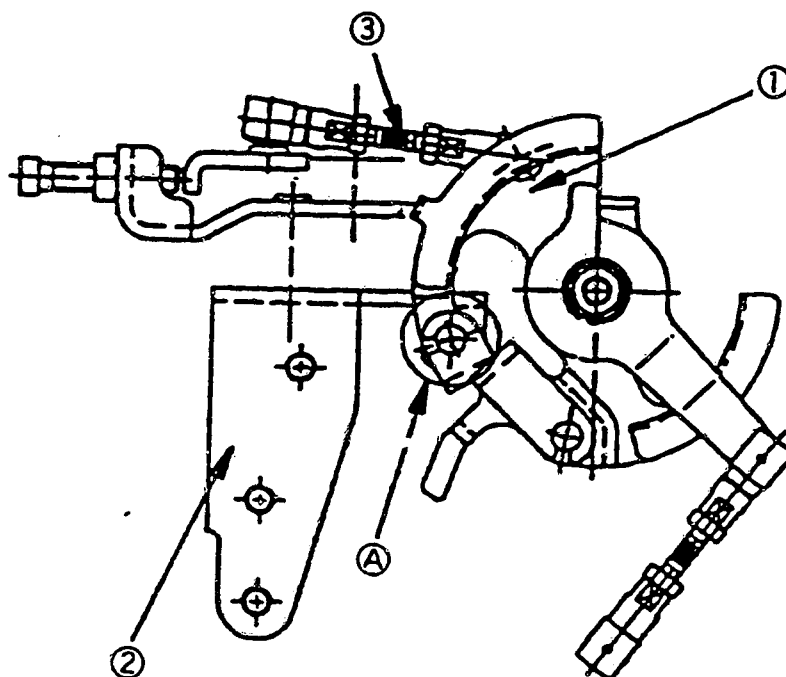


Figure 24

104749-0470 3/4

- 1 = Side link lever
- 2 = Bracket
- 3 = Connecting rod

#### ■ SIDE LINK LEVER ADJUSTMENT

1. Fix the control lever in the idling position.
2. Adjust the connecting rod (3) so that the pin (diameter 5.8 -0.2 mm) is inserted through both the bracket (2) hole and the side link lever (1) hole (section A) to align them.





■ W-CSD ADJUSTMENT

1. Timer Stroke Adjustment

- 1) Calculate the timer stroke from Fig. 26 according to the atmospheric temperature at the time of adjustment.
- 2) Adjust using the screw (1) so that the timer stroke is as calculated in step 1).

2. W-FICD Adjustment

- 1) Adjust using the screw (2) so that the screw (2) length (dimension  $l$ ) is  $12.3 \pm 0.5$  mm.

3. Dimension  $l$  Adjustment

- 1) Calculate the gap ( $l$ ) between the micro switch and the control lever from Fig. 26 according to the atmospheric temperature at the time of adjustment.
- 2) Adjust using the turn bacle so that the gap ( $l$ ) between the micro switch and the control lever is as calculated in step 1.

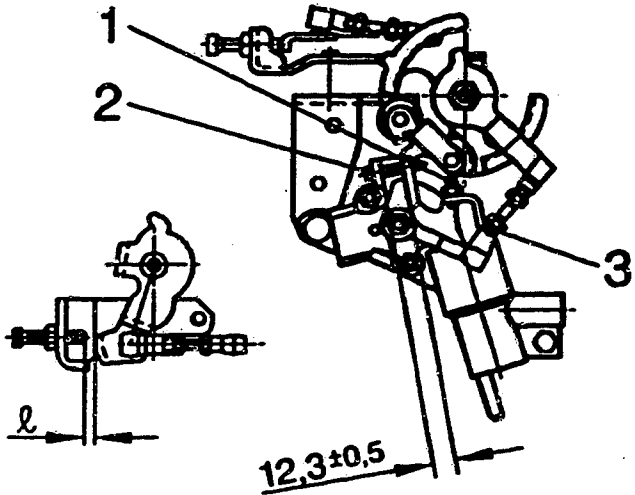


Figure 25

Figure 26

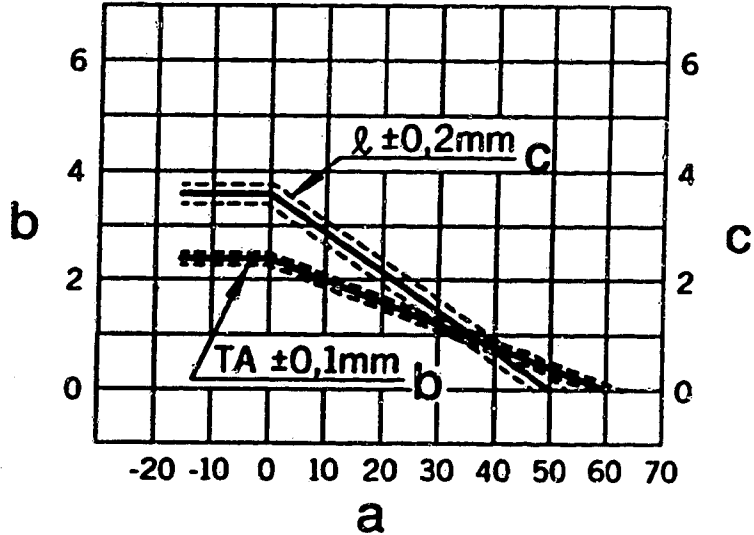
a = Atmospheric temperature  
b = Timer stroke (TA mm)  
c = Gap between control lever  
and idling stopper bolt ( $l$  mm)

Formula for calculating Timer Stroke:

$$TA = -0.04 t + 2.4 \quad (t \geq 0^\circ\text{C})$$

Formula for calculating control lever  
and micro switch gap:

$$l = -0.072 t + 3.6 \quad (t \geq 0^\circ\text{C})$$



Test oil:		ZEXEL - TEST VALUES			1/2		
ISO 4113 or		Distributors pumps			BOSCH No. 9 460 610 425		
SAE J967d		Engine model: LD20			ZEXEL No. 104749-2152		
					Date: 31.01.1992 [0]		
					Company: NISSAN		
					No. 16700 43S00		
Injection pump no.: 104649-2122		(NP-VE4/9F2500RNP20)					
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:			Test pressure line:		
		1 688 901 000			1 680 750 017		
1. Setting values		P. Speed (rpm)	Setting values		Charge-air pressure bar (mmHg)	Difference in delivery (cc)	
1-1	Timing device travel	900	1.1 - 1.7 (mm)			2.5	
1-2	Supply pump pressure	900	2.9 - 3.5 (kg/cm²)				
1-3	Full load delivery	900	32.5 - 33.5 (cc/1000st)				
	Full load delivery		(cc/1000st)				
1-4	Idle speed regulation	325	6.7 - 9.7 (cc/1000st)				
1-5	Start	100	above 52.0 (cc/1000st)				
1-6	Full-load speed regulation	2700	7.2 - 13.2 (cc/1000st)				
1-7							
2. Test values							
2-1 Timing device		N = rpm	900	1800	2300	3. Dimensions	
		mm	1.0 - 1.8	4.5 - 5.7	6.9 - 7.8		
2-2 Supply pump		N = rpm	900	1800	2300		
		kg/cm²	2.8 - 3.6	4.9 - 5.7	6.2 - 7.0		
2-3 Overflow delivery		N = rpm	1000				
		cc/10s	36.0 - 80.0				
2-4 Fuel injection quantities							
Control lever position		Pump Speed (rpm)	Fuel delivery (cc/1000 strokes)	Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop		900	32.0 - 34.0				
		600	31.2 - 35.2				
		2300	30.6 - 34.6				
		2700	6.7 - 13.7				
		2800	below 6.0				
Switch off		325	0				
Idle		325	6.2 - 10.2	2.5			
stop		500	below 4.0				
Partial load		900	5.0 - 15.0				
2-5 Solenoid		Cut-in voltage max.: 8V Test voltage: 12 - 14V					



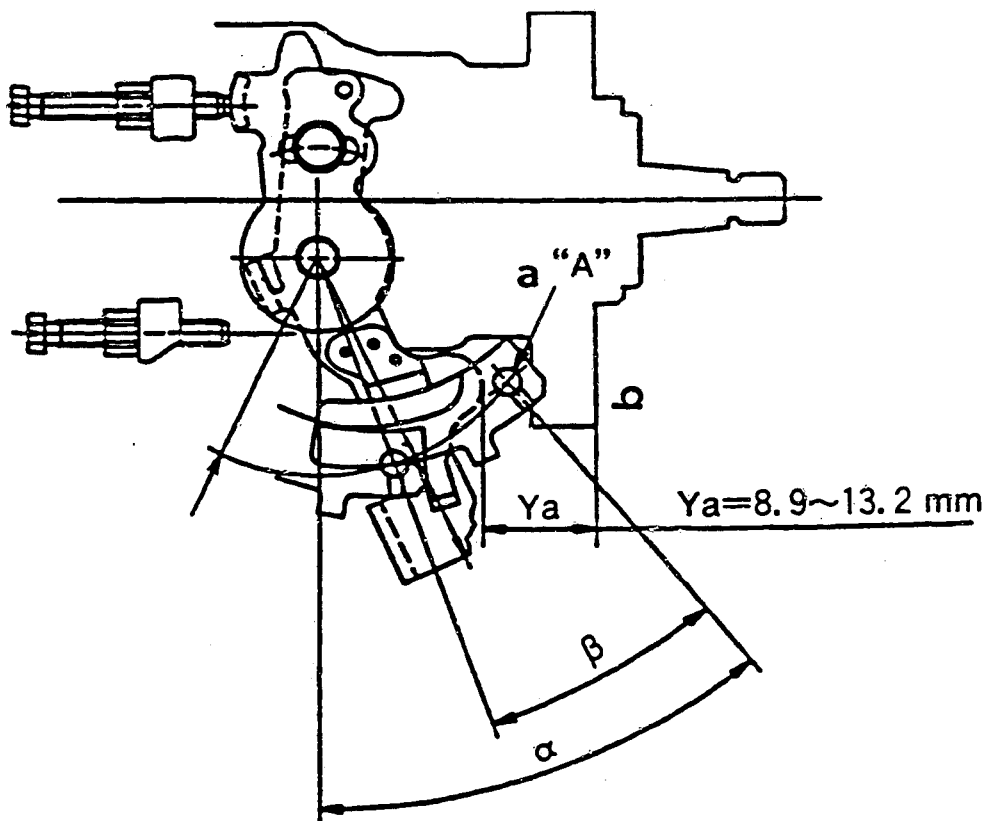


Bild 27

104749-2152 2/2

- a = Hole
- b = End face of flange

#### ■ CONTROL LEVER ANGLE MEASUREMENT POSITION

1. Measure the control lever angles ( $\alpha$ ,  $\beta$ ,  $\gamma$ ) at hole "A".



Test oil:		ZEXEL - TEST VALUES			1/3	
ISO 4113 or		Distributors pumps			BOSCH No. 9 460 610 521	
SAE J967d		Engine model: LD20			ZEXEL No. 104749-2232	
					Date: 31.01.1992 [0]	
					Company: MISA	
					No. 16700 D9702	
Injection pump no.: 104649-2232		(NP-VE4/9F2200RNP465)				
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:			Test pressure line:	
		1 688 901 000			1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values		Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	900	1.3 - 1.7 (mm)			2.5
1-2	Supply pump pressure	900	3.2 - 3.8 (kg/cm²)			
1-3	Full load delivery	2200	29.3 - 30.3 (cc/1000st)			
	Full load delivery		(cc/1000st)			
1-4	Idle speed regulation	350	4.7 - 7.7 (cc/1000st)			
1-5	Start	100	40.0 - 50.0 (cc/1000st)			
1-6	Full-load speed regulation	2570	10.4 - 16.4 (cc/1000st)			
1-7	Load-timer Adjustment	900	T-0.45-0.85 (mm)			
2. Test values						
2-1 Timing device		N = rpm mm	900 1.2 - 1.8	1800 5.5 - 6.7	2200 7.2 - 8.4	3. Dimensions
2-2 Supply pump		N = rpm kg/cm²	900 3.1 - 3.9	1800 5.1 - 5.9	2200 6.0 - 6.8	
2-3 Overflow delivery		N = rpm cc/10s	900 35.0 - 79.0			
2-4 Fuel injection quantities						
Control lever position		Pump Speed (rpm)	Fuel delivery (cc/1000 strokes)	Charge-air pres (mmHg)	Difference in delivery (cc)	
End stop		2200	28.8 - 30.8	2.5		
		900	27.6 - 31.6			
		2570	9.9 - 16.9			
		2800	below 6.0			
Switch off		350	0			
Idle stop		350	4.2 - 8.2	2.5		
		500	below 3.0			
Partial load		900	4.1 - 14.1			
2-5 Solenoid		Cut-in voltage max.: 8V Test voltage: 12 - 14V				

E20

ZEXEL - Test specifications  
Injection pumps

E21

ZEXEL - Test specifications  
Injection pumps

# 1. Adjustment

1) Fix the control lever in the position satisfying the following conditions:

Boost Pressure: - mmHg  
 Pump Speed : 900 rpm  
 Fuel Injection Quantity: 16.0 - 18.0 cc/1000st

2) With the control lever positioned as described in 1) above, adjust the governor sleeve so that the Timer Stroke conforms to the specified values (1-7).

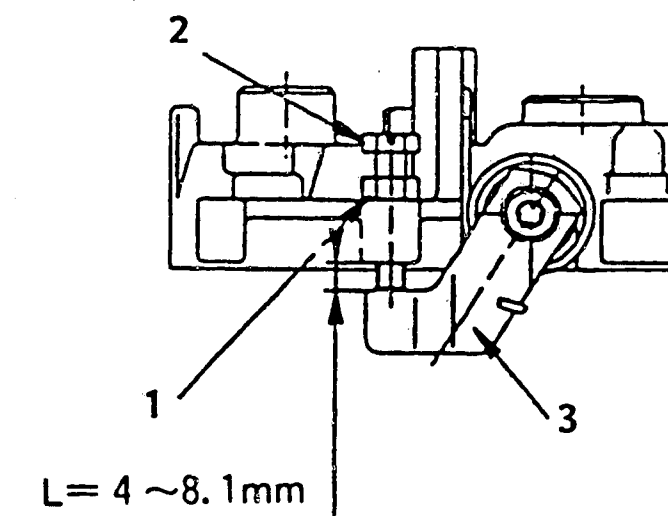
# 2. Confirmation of Timer Characteristics

Fix the control lever in the position satisfying the following conditions, and confirm the Timer Stroke.

Control lever position			Specified values	
Pump speed (rpm)	Fuel injection quantity (cc/1000st)	Boost pressure (mmHg)	Timer stroke (mm)	Timer stroke reduction value (mm)
900	-	-	-	0.45 - 0.85
900	-	-	-	0.45 - 0.85

Figure 28

1 = Locknut  
 2 = Adjusting bolt  
 3 = Stop lever



# STARTING INJECTION QUANTITY ADJUSTMENT

Adjust the starting injection quantity (page 1/3) using the adjusting bolt (as shown in the figure at right).



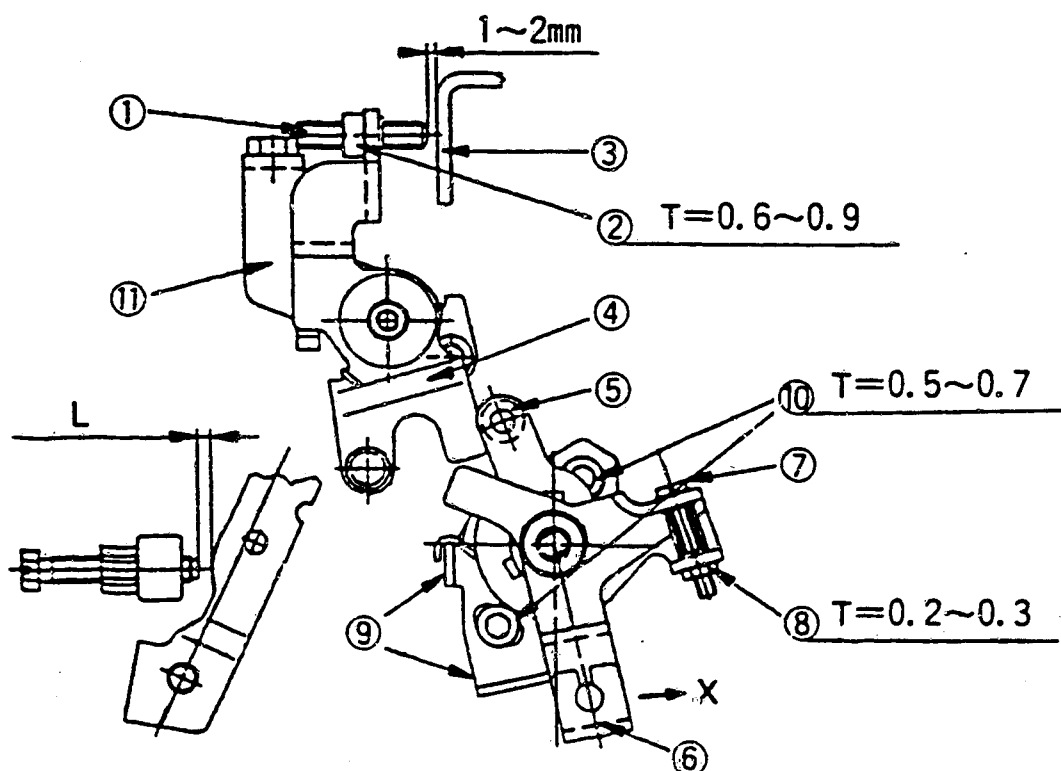


Figure 29

104749-2232 3/3

# ■ M-CSD ADJUSTMENT

## 1. Fix the intermediate lever adjustment screw in position (adjust with the M-CSD released)

- 1) Hold the control lever (3) in the idling position.
- 2) Move the adjusting screw to a horizontal position.
- 3) Adjust using the adjusting screw (1) so that the gap between the control lever (3) and the adjusting screw (1) is 1 - 2 mm, and then fix the screw using the nut.



(Continued)

## 2. Fixing the M-CSD Stopper (9)

- 1) Turn the drive shaft slowly and fix the drive shaft in a position where a load is applied (the point where the roller holder contacts the cam surface of the cam disc).
- 2) Move the CSD lever (6) to the advance side.
- 3) Fix the CSD lever in the position where the ball pin at the tip of the shaft lightly contacts the roller holder (roller holder advance angle "0").
- 4) Move the M-CSD lever (6) until it contacts the stopper (9), and check that the timer stroke at this point is 1.03 - 1.43 mm.

## 3. Screw (7) Adjustment

- 1) Operate the CSD lever (6) move the CSD lever until it contacts the stopper (9).
- 2) Then, adjust the screw (7) so that the clearance between the control lever and the idling stopper bolt is  $7.2 \pm 0.5$  mm (control lever angle  $11^\circ$ ), and fix the screw (7) using the nut (8).



Test oil		ZEXEL - TEST VALUES				1/3	
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 473	
SAE J967d		Engine model: TD42				ZEXEL No. 104760-4161	
						Date: 31.01.1992 [0]	
						Company: NISSAN DIESEL	
						No. 16700 34T03	
Injection pump no.: 104660-4161		(NP-VE6/10F2000RNP102)					
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:				Test pressure line:	
		1 688 901 000				1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1000	1.4 - 1.8 (mm)				3.5
1-2	Supply pump pressure	1000	3.9 - 4.3 (kg/cm²)				
1-3	Full load delivery	1000	47.3 - 48.3 (cc/1000st)				
	Full load delivery		(cc/1000st)				
1-4	Idle speed regulation	350	6.8 - 10.8 (cc/1000st)				2.0
1-5	Start	300	53.0 - 57.0 (cc/1000st)				
1-6	Full-load speed regulation	2300	14.7 - 18.7 (cc/1000st)				5.0
1-7	Load-timer adjustment						
2. Test values							
2-1	Timing device	N = rpm	1000		1800	2300	
		mm	1.3- 1.9		5.2-6.4	6.8-7.8	
2-2	Supply pump	N = rpm	1000	1600	1800		
		kg/cm²	3.9- 4.3	5.2-5.8	5.8-6.4		
2-3	Overflow delivery	N = rpm	1000				
		cc/10s	45.0-88.0				
2-4 Fuel injection quantities							
Speed control lever pos.		P. Speed (rpm)	Fuel delivery (cc/1000st)	Charge-air pres (mmHg)	Difference in delivery (cc)		
End stop		1000	46.8 - 48.8				
		600	46.9 - 50.9				
		2000	39.4 - 43.6				
		2100	35.8 - 44.8				
		2300	14.2 - 19.2				
		2500	below 5.0				
Switch off		350	0				
Idle-stop		450	below 3.0				
		350	6.8 - 10.8				
2-5 Solenoid		Cut-in voltage max.: 16V					
		Test voltage: 24 - 26V					
3. Dimensions							
K	3.2 - 3.4 mm						
KF	6.34 - 6.54 mm						
MS	1.0 - 1.2 mm						
BCS	- mm						
Pre-st.	- mm						
Control lever angle							
α	51.5°- 69.5°deg						
Ya	24.3 - 28.7 mm						
β	35°- 45° deg						
B	10.6 - 14.3 mm						
γ	- deg						
C	- mm						

F1

ZEXEL - Test specifications  
Injection pumps



F2

ZEXEL - Test specifications  
Injection pumps





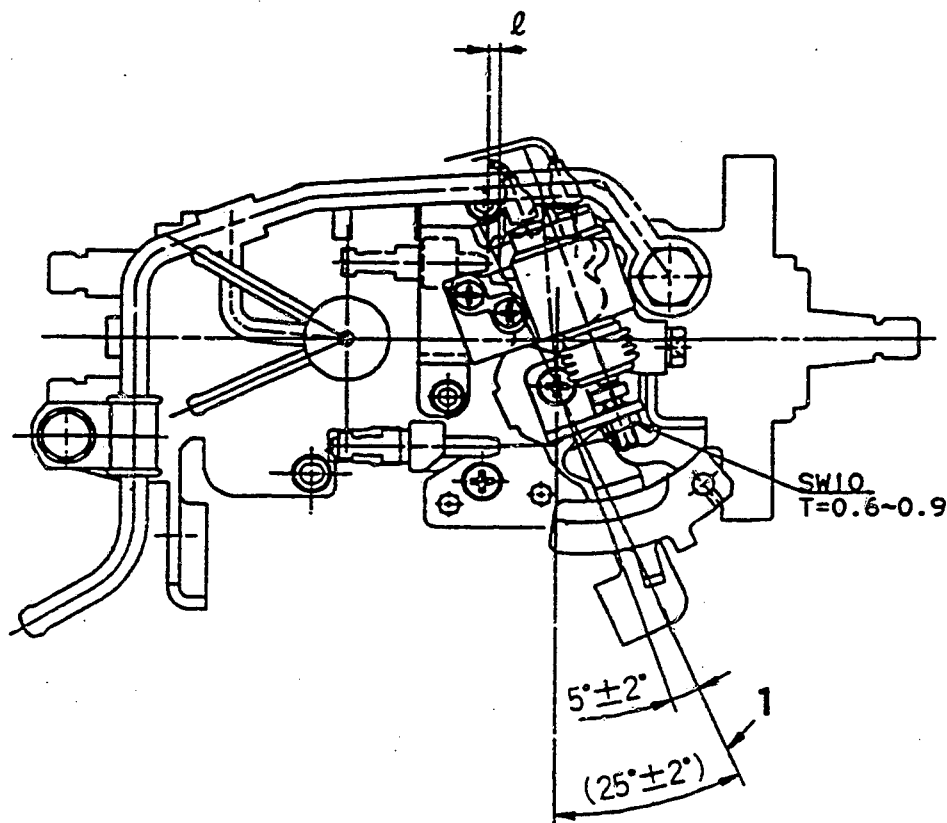


Figure 30

104760-4161 2/3

1 = Idling position

#### ■ ACCELERATOR SWITCH ADJUSTMENT

1. Insert a block gauge of 3.3 mm thickness between the idling stopper bolt and the bracket (control lever angle:  $5^{\circ} \pm 2^{\circ}$ ).
2. Then, adjust the installation position of the accelerator switch so that it is turned OFF.



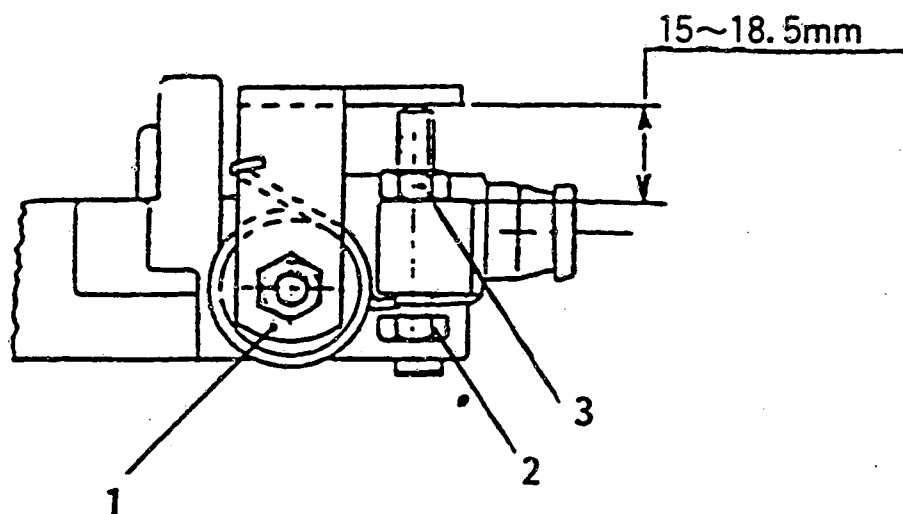


Figure 31

104760-4161 3/3

- 1 = Lever
- 2 = Adjusting bolt
- 3 = Locknut

#### ■ STARTING INJECTION QUANTITY ADJUSTMENT

Adjust the starting injection quantity (item 1-5) using the adjusting bolt.



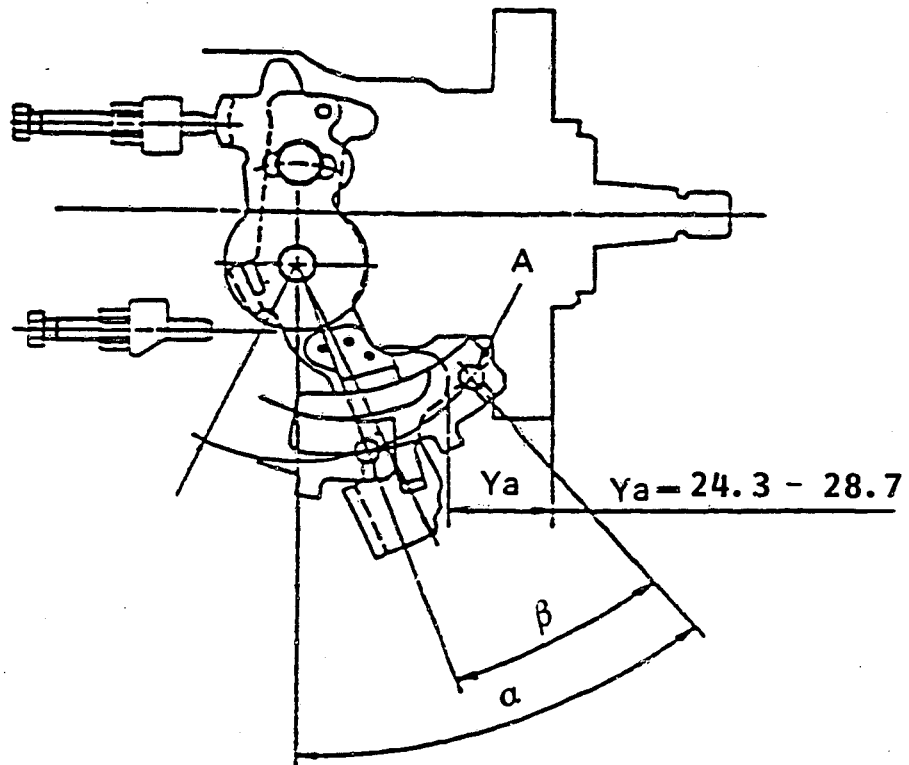


Figure 32

104760-4161 3/3  
(Continued)

### CONTROL LEVER ANGLE MEASUREMENT POSITION

1. Measure the control lever angles ( $\alpha$ ,  $\beta$ ,  $\gamma$ ) at hole "A".



Test oil		ZEXEL - TEST VALUES				1/4	
ISO 4113 or		Distributor pumps				BOSCH No. 9 460 610 415	
SAE J967d		Engine model: RD28				ZEXEL No. 104769-2105	
						Date: 31.01.1992 [0]	
						Company: NISSAN	
						No. 16700 V7213	
Injection pump no.: 104669-2113		(NP-VE6/9F2500RNP40)					
Pump rot.: Clockwise-viewed from drive side		Test-nozzle holder combination:				Test pressure line:	
		1 688 901 000				1 680 750 017	
1. Setting values		P. Speed (rpm)	Setting values			Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	900	1.2 - 1.6 (mm)				2.5
1-2	Supply pump pressure	900	3.5 - 4.1 (kg/cm²)				
1-3	Full load delivery	900	30.9 - 31.9 (cc/1000st)				
	Full load delivery		(cc/1000st)				
1-4	Idle speed regulation	350	5.8 - 8.8 (cc/1000st)				
1-5	Start	100	above 38.0 (cc/1000st)				
1-6	Full-load speed regulation	2600	15.5 - 21.5 (cc/1000st)				
1-7	Load-timer adjustment						
2. Test values							
2-1	Timing device	N = rpm	900	1200	2300		
		mm	1.1- 1.7	2.9-3.7	8.1-9.0		
2-2	Supply pump	N = rpm	900		1800	2500	
		kg/cm²	3.4- 4.2		5.5-6.3	7.2-8.0	
2-3	Overflow delivery	N = rpm	900				
		cc/10s	43.0-87.0				
2-4 Fuel injection quantities							
Speed control lever pos.		P. Speed (rpm)	Fuel delivery (cc/1000st)		Charge-air pres (mmHg)	Difference in delivery (cc)	
End stop		900	30.4 - 32.4				
		600	29.1 - 33.1				
		2300	28.0 - 32.0				
		2600	15.0 - 22.0				
		2800	below 5.0				
Switch off		350	0				
Idle-stop		350	5.3 - 9.3		1.9		
		500	below 4.0				
Partial load		900	2.5 - 12.5				
2-5 Solenoid		Cut-in voltage max.: 8V					
		Test voltage: 12 - 14V					
3. Dimensions							
K	3.2 - 3.4 mm						
KF	6.54 - 6.74 mm						
MS	1.7 - 1.9 mm						
BCS	- mm						
Pre-st.	- mm						
Control lever angle							
α	19° - 27° deg						
A	8.7 - 12.9 mm						
β	37° - 47° deg						
B	11.5 - 15.2 mm						
γ	10.5° - 11.5°deg						
C	5.7 - 6.3 mm						

F6

ZEXEL - Test specifications  
Injection pumps



F7

ZEXEL - Test specifications  
Injection pumps



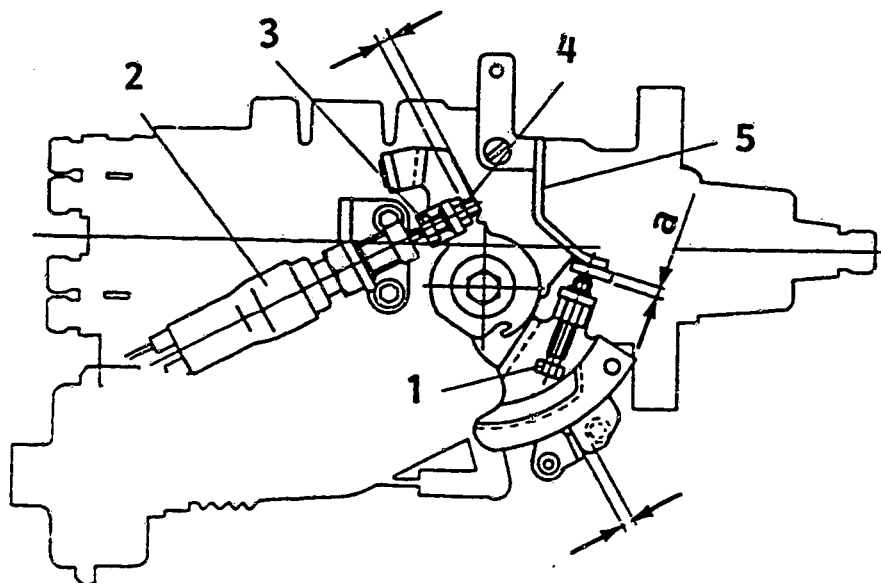


Figure 33

104769-2105 2/4

- 1 = Idling stopper bolt
- 2 = Accelerator Switch
- 3 = Accelerator switch adjustment screw
- 4 = Lock nut
- 5 = Bracket

a = Block gauge

#### ■ ACCELERATOR SWITCH ADJUSTMENT

1. Adjust so that the accelerator switch adjustment screw protrudes 4 mm from the locknut, and then lock in position.
2. Insert a block gauge of  $2.6 \pm 0.1$  mm thickness between the idling stopper bolt and the bracket.
3. Then, adjust the installation position of the accelerator switch so that it is turned OFF.



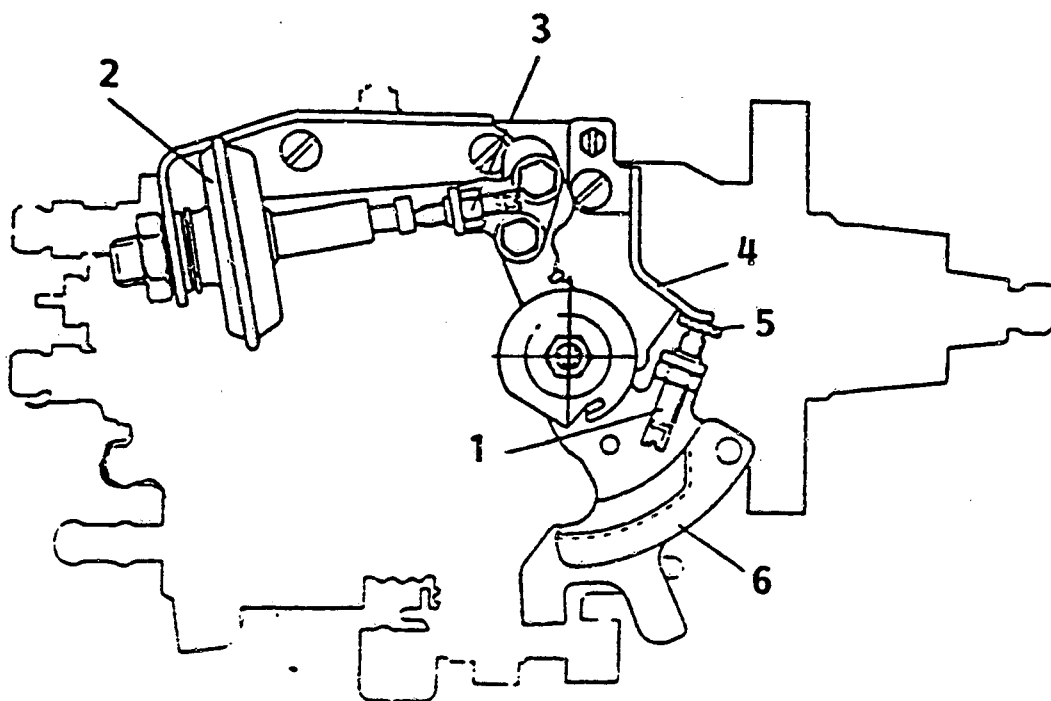


Figure 34

104769-2105 3/4

- 1 = Idling stopper bolt
- 2 = Dash potschraube
- 3 = Dash pot adjusting screw
- 4 = Bracket
- 5 = Block gauge
- 6 = Control lever

#### ■ DASH POT ADJUSTMENT

1. Insert a block gauge (thickness gauge) of thickness  $2.7 \pm 0.05$  mm in the gap between the control lever and the idling stopper bolt.
2. With the control lever positioned as described in 1. above, adjust the dashpot adjusting screw so that the dashpot adjusting screw and the push rod are in contact.  
Fix the screw using the nut.



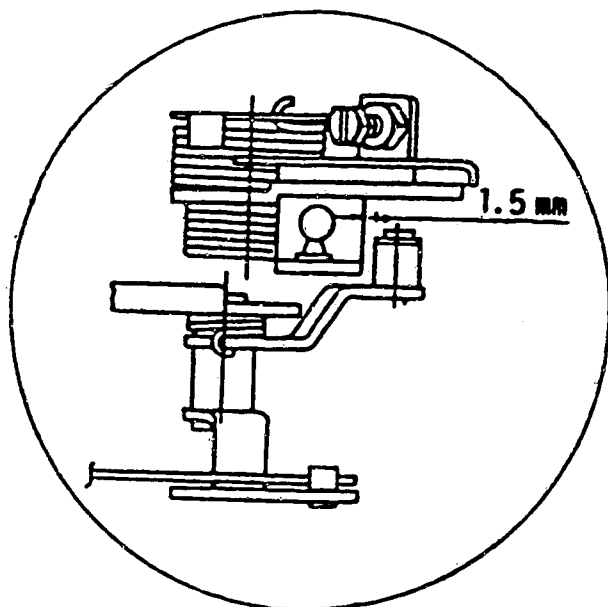
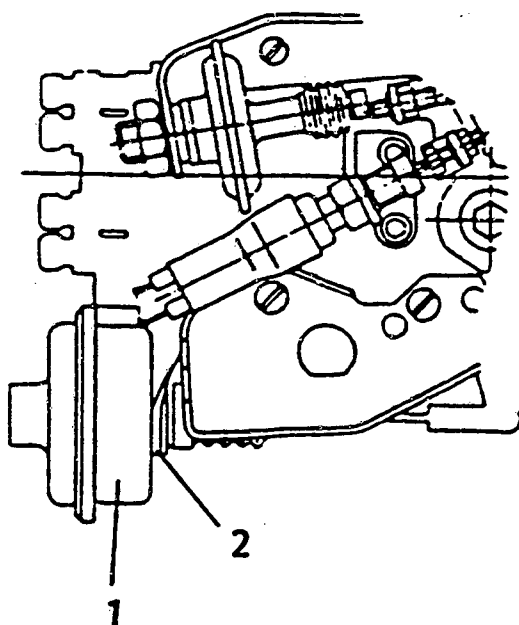


Bild 35

104769-2105 3/4  
(Continued)

- 1 = ISC Actuator  
2 = Bracket

### ■ ISC (Idle Speed Control) ACTUATOR INSTALLATION

1. Hold the control lever in the idling position
2. Adjust the position of the actuator bracket so that the gap between the control lever and the ISC lever roller is

$1.0^{+0.1\text{mm}}$   
 $-0.5\text{mm}$

Then fix the bracket in position.



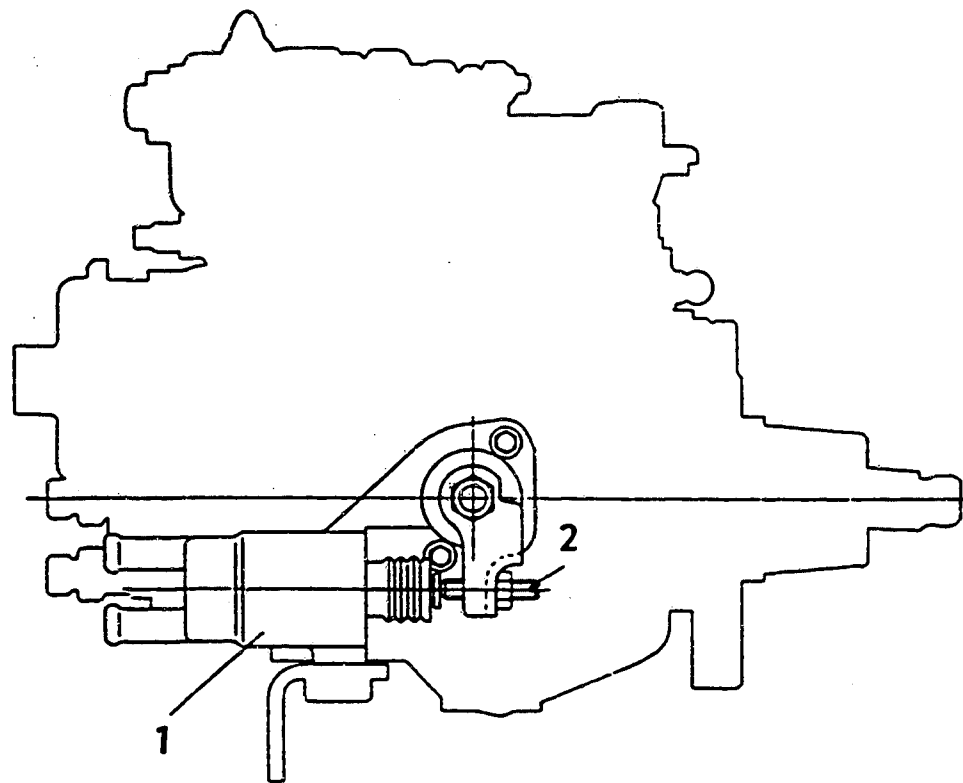


Figure 36

- 1 = W-CSD
- 2 = Timer stroke adjusting screw

■ W-CSD ADJUSTMENT

1. Timer Stroke Adjustment (Refer to Figs. 36 and 37)

- 1) Using the graph (Figure 37), determine the timer stroke according to the atmospheric temperature at the time of adjustment.
- 2) Adjust using the timer stroke adjusting bolt so that the timer stroke corresponds to the value determined in the note 1) above.

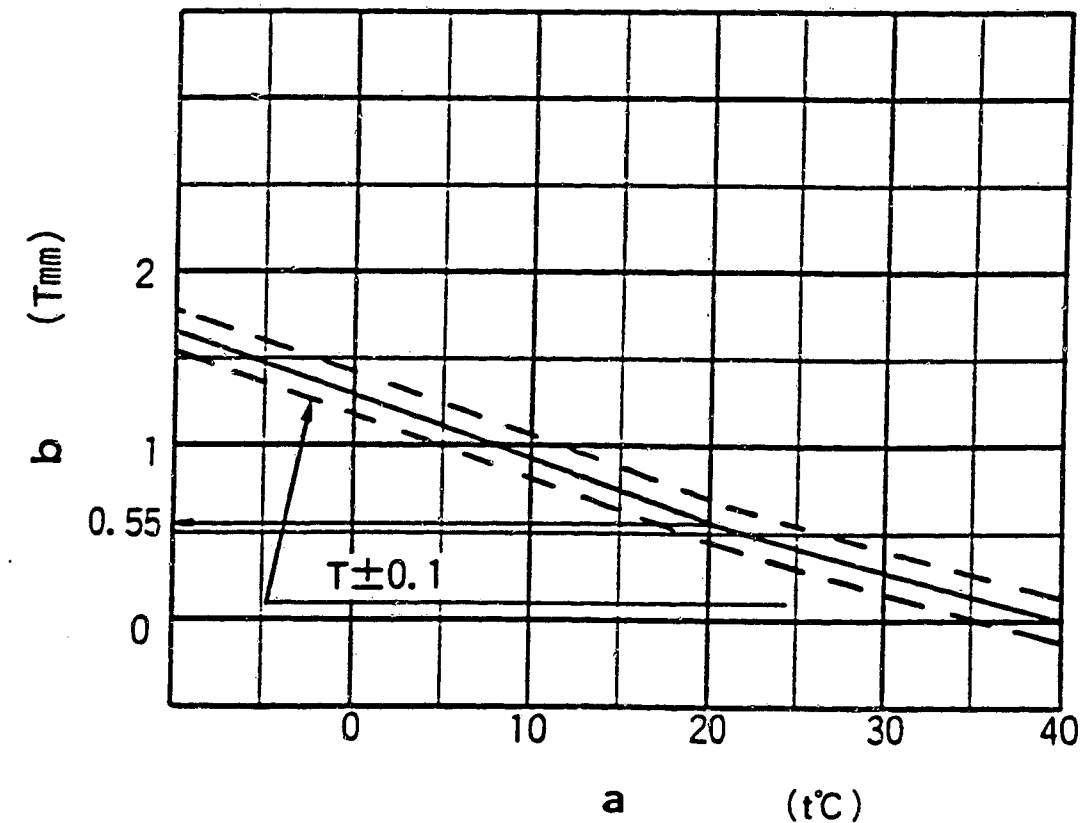


Figure 37

- a = Atmospheric temperature
- b = Timer stroke

104769-2105 4/4





Test oil:  
ISO 4113 or  
SAE J967d

ZEXEL - TEST VALUES  
Distributors pumps  
Engine model: RD28

1/3

BOSCH No. 9 460 610 516  
ZEXEL No. 104769-2175  
Date: 31.01.1992 [0]  
Company: NISSAN  
No. 16700 C9601

Injection pump no.: 104669-2175

(NP-VE6/9F2500RNP59)

Pump rot.: Clockwise-viewed from drive side

Test-nozzle holder combination:  
1 688 901 000

Test pressure line:  
1 680 750 017

1. Setting values		P. Speed (rpm)	Setting values	Charge-air pressure bar (mmHg)	Difference in delivery (cc)
1-1	Timing device travel	1200	2.0 - 2.4 (mm)		
1-2	Supply pump pressure	1200	4.2 - 4.8 (kg/cm <sup>2</sup> )		
1-3	Full load delivery	900	29.0 - 30.0 (cc/1000st)		2.5
	Full load delivery		(cc/1000st)		
1-4	Idle speed regulation	350	5.8 - 8.8 (cc/1000st)		1.4
1-5	Start	100	above 38.0 (cc/1000st)		20.0
1-6	Full-load speed regulation	2600	15.5 - 21.5 (cc/1000st)		5.0
1-7					

## 2. Test values

2-1 Timing device	N = rpm	1200	1800	2500
	mm	1.9 - 2.5	4.9 - 5.7	7.3 - 8.2
2-2 Supply pump	N = rpm	1200	1800	2500
	kg/cm <sup>2</sup>	4.1 - 4.9	5.5 - 6.3	7.2 - 8.0
2-3 Overflow delivery	N = rpm	1200		
	cc/10s	48.0 - 92.0		

## 2-4 Fuel injection quantities

Control lever position	Pump Speed (rpm)	Fuel delivery (cc/1000 strokes)	Charge-air pres (mmHg)	Difference in delivery (cc)
End stop	900	28.5 - 30.5		
	600	27.1 - 31.1		
	2300	26.8 - 30.8		
	2600	15.0 - 22.0		
	2800	below 5.0		
Switch off	325	0		
	900	0		
Idle stop	350	5.3 - 9.3		
	500	below 4.0		
Partial load	900	2.5 - 12.5		
2-5 Solenoid	Cut-in voltage max.: 8V Test voltage: 12 - 14V			

## 3. Dimensions

K	3.2 - 3.4 mm
KF	6.54 - 6.74 mm
MS	1.7 - 1.9 mm
BCS	- mm
Pre-str.	- mm

## Control lever angle

α	19° - 27° deg
A	8.7 - 12.9 mm
β	37° - 47° deg
B	11.5 - 15.2 mm
γ	10.5° - 11.5° deg
C	5.7 - 6.3 mm

F13

ZEXEL - Test specifications  
Injection pumps



F14

ZEXEL - Test specifications  
Injection pumps



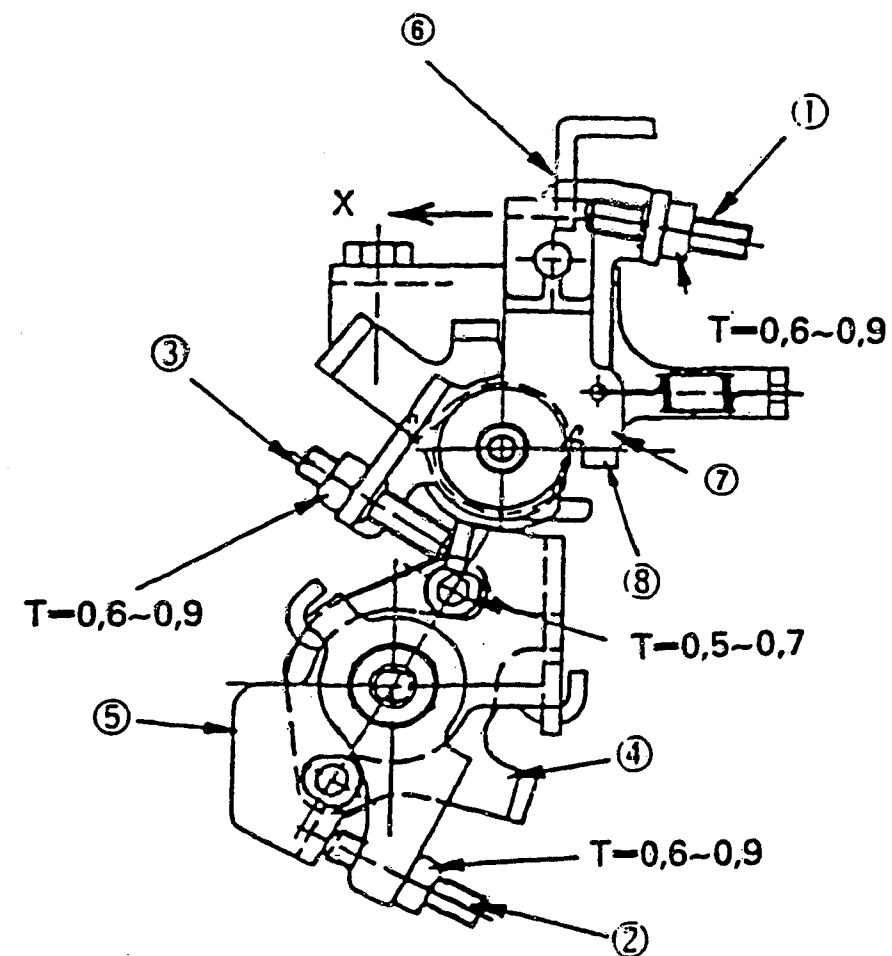
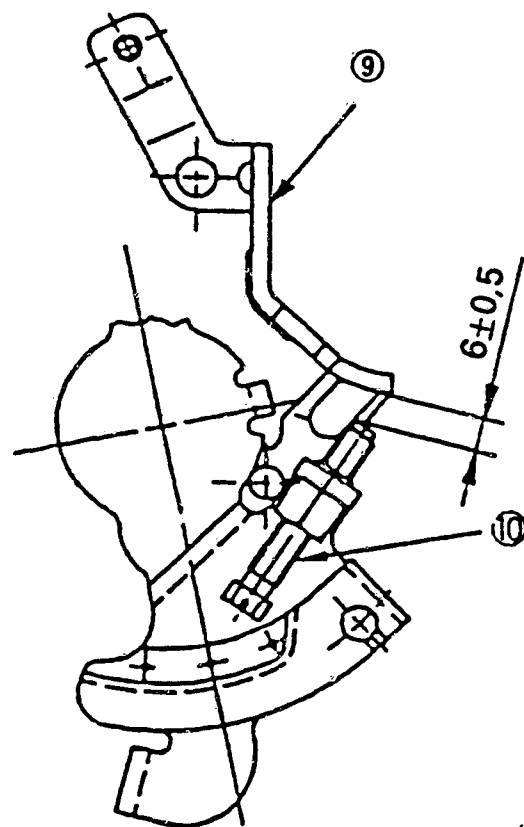


Figure 38

104769-2175 2/3

9 = Idling set bracket

6 = Control lever

7 = Intermediate lever

# ■ M-CSD ADJUSTMENT

## 1. CSD Adjustment

- 1) Hold the control lever (6) in the idling position.
- 2) Move the CSD lever (5) to the right until it contacts the stopper (4).
- 3) Then, adjust the position of the screw (2) so that the timer stroke is 1.6 mm and fix the screw (2) using the nut.



(Continued)

## **2. Fixing the Intermediate Lever Adjustment Screw**

- 1) Hold the CSD lever (5) in the position described in item 1 (timer stroke: 1.6 mm).
- 2) Move the intermediate lever (7) toward "X" and confirm that it contacts the stopper (8).
- 3) Then, adjust the screw (3) so that the CSD lever (5) contacts the screw (3) and fix the screw (3) using the nut.
- 4) Return the intermediate lever (7) to its original position and confirm that the timer stroke is 0 mm.

## **3. Screw (1) Adjustment**

- 1) Move the intermediate lever (7) toward "X" until it contacts the stopper (8).
- 2) Adjust the position of the screw (1) so that the gap between the idling set bracket (9) and screw (10) is  $6 \pm 0.5$  mm, and fix screw (1) using the nut.
- 3) Then, confirm that the gap between the control lever (6) and screw (1) is approximately 1.7 mm.



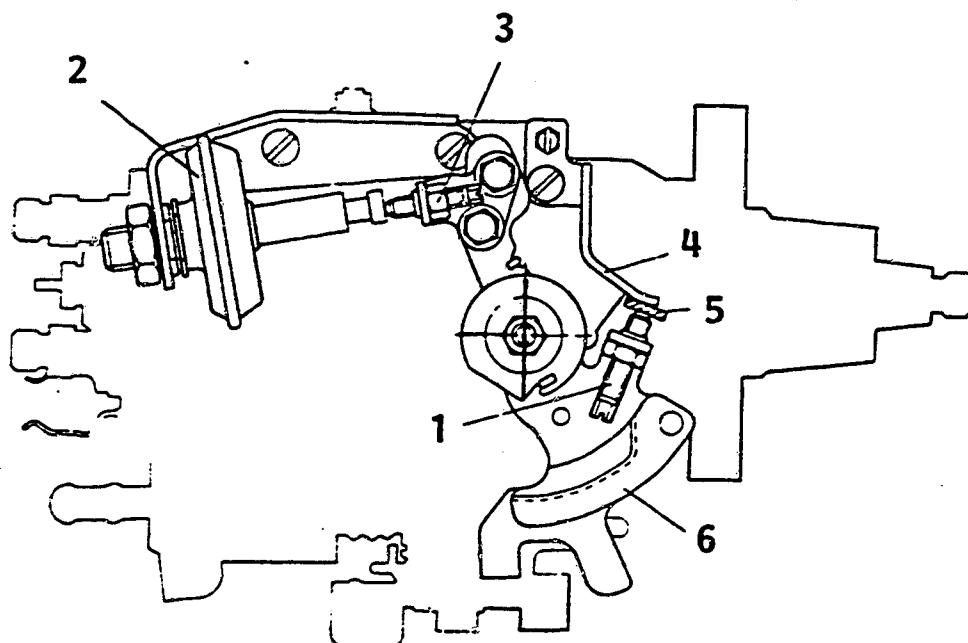


Figure 39

104769-2175 3/3

- 1 = Idling stopper bolt
- 2 = Dash pot
- 3 = Dash pot adjusting screw
- 4 = Bracket
- 5 = Block gauge
- 6 = Control lever

#### ■ DASH POT ADJUSTMENT

1. Insert a block gauge (thickness gauge) of thickness  $2.7 \pm 0.05$  mm in the gap between the idling stopper bolt and the bracket.



(Continued)

2. With the control lever positioned as described in item 1., adjust the dashpot adjusting screw so that the dashpot adjusting screw and the pushrod are in contact.

Fix the screw using the nut.

**Caution:**

- The adjusting screw and the pushrod must move together smoothly.
- Confirm that the control lever returns to the idling position.

